



Earth Science

APRIL 1961

45c

ROCKHOUND'S NATIONAL MAGAZINE



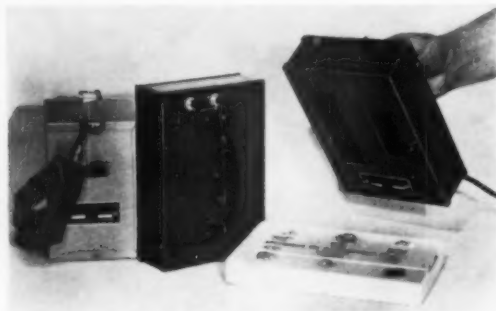
STONEHENGE—England's Noted Relic

Tiger Eye Twin

LONG AND SHORT WAVE ULTRA-VIOLET UNIT

only
\$29⁷⁵

Tiger Eye Twin model 25-36 shown
 with Battery Case model BA-245

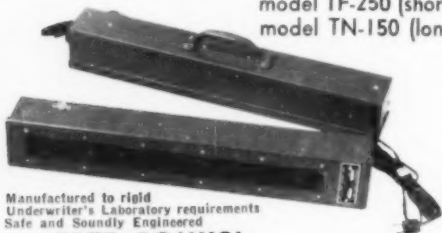


The TIGER EYE TWIN, when equipped with the Battery Adapter Case model BA-245 (optional—\$5.75) and two 45 volt #202 "B" batteries (optional—\$3.50 each) can be carried right into the field to give you on-the-spot information about the minerals you discover.

- Most powerful for the price . . . anywhere
- Based on the latest engineering principles
- Combines long and short wave in one unit
- Rugged all metal housing
- Extra large filters
- Comes set up, ready to use
- Easy access for replacing tubes
- Completely portable for field prospecting (with BA-245 case)
- Operates on house current or batteries
- Special circuitry for battery conservation
- Light weight . . . only 1 lb., 15 ozs.
- Compact . . . 5½" x 2" x 8½"
- Completely guaranteed

New TIGER EYE DISPLAY UNITS

model TF-250 (short-wave) **\$58.95**
 model TN-150 (long-wave) **\$28.95**



Manufactured to rigid
 Underwriter's Laboratory requirements
 Safe and Soundly Engineered

FREE BONUS!

All TIGER EYE Units come with fact-filled booklet "The Unseen World Around Us," including extensive lists of fluorescent minerals, woods, etc., PLUS Six Identified Specimens of long and short wave Fluorescent Minerals.

BLE

Manufactured and guaranteed by:

**BLACK LIGHT
 EASTERN
 CORPORATION**

Port Washington, L.I. N.Y.
 Dept. ES-8

- Output: Most powerful units for the price
- Extra large filters: 1½" x 16½"
- Angle-parabolic Alzac reflectors
- Handle removable for Display Mounting
- Isolated wiring compartment, SAFE for changing tubes. (Exceptional in this price range)
- Weight only 5 lbs. Size 3" x 3" x 20"
- Completely guaranteed

Contact your local dealer . . . or use this handy coupon today . . .

Black Light Eastern Corporation

4 Manhasset Avenue, Port Washington, L.I., N.Y. Dept. ES-8

Please rush!

_____ Tiger Eye Twin(s) #25-36	@ \$29.75 ea. _____
_____ Battery Adapter(s) #BA-245 (with carrying strap)	@ 5.75 ea. _____
_____ 45 volt #202 "B" batteries (2 required)	@ 3.50 ea. _____
_____ Tiger Eye #TF-250	@ 58.95 ea. _____
_____ Tiger Eye #TN-150	@ 28.95 ea. _____
	TOTAL \$ _____

Postage, Insurance and handling
 East of Mississippi .50—West of Mississippi \$1.00
 Enclose check or money order.

Name _____
 Address _____
 City _____ State _____ Zone _____



Volume 14
No. 2
\$2.50 a Year

Official Publication of the Midwest Federation of Mineralogical Societies.

EARTH SCIENCE PRESENTS FOR APRIL, 1961

- 53 EDITOR'S MEMO PAD
Early Club History, Club Shows, Rip Rap, and our authors
- 57 MIDWEST CLUB NEWS Bernice Rexin
With more than 100 Midwest Clubs to report on, our Club Editor almost has more than her hands full.
- 59 NEW GAVEL FOR MIDWEST PRESIDENTS W. H. deNuei
A splendid piece of artistry memorializing our late friend Gus Brown who did much for our Federation.
- 61 EXCAVATING REE INDIAN SITES June Culp Zeitner
Progress on one hand often destroys on the other, and it is fortunate that there are those who have the insight to save that which might be forever lost.
- 64 AMBER LORE Lillian Mihelcic
This strange organic substance, neither plant nor animal, has been cherished, if not revered, throughout all ages.
- 65 ALBERT E. FOOTE Edward H. Kraus
Individuals leave their mark in the world in many ways, and the subject of this sketch is one of the finest examples of this truism.
- 69 STONEHENGE, ENGLAND'S NOTED RELIC Burke Smith, Jr.
We are indebted to our author for one of the best articles upon this subject that we have yet seen. Read it carefully.
- 73 NOTES ON PLIOHIPPIUS FIND Robert Steele
Reports of new fossil finds are always welcome, and all should be encouraged to write about them.
- 75 BOOK REVIEWS
- 82 BIBLIOGRAPHY, CHICAGO AREA Tomasz J. Turley
A valuable compilation of references which should aid many students of the geology of the Chicago land.
- 91 ADVERTISERS' INDEX
- 92 CLASSIFIED ADVERTISING

Cover England's Noted Relic

Photo by our author Burke Smith who toured England recently and made this unique picture of one of the most enigmatic archaeological relics on earth today. When, why and by whom built yet remain some of our most puzzling questions.

STAFF

- BEN HUR WILSON
Editor in Chief
- WILLIAM H. ALLAWAY
*Associate Editor,
Subscription Mgr. & Sec'y*
- MRS. BERNICE REXIN
Club Editor
- J. DANIEL WILLEMS
Business Manager
- ORVAL M. FETHER
Treasurer
- EARL D. CORNWELL
Advertising Manager
- RUSSELL KEMP
Promotional Director
- Associate Editors**
- Frank L. Fleener
Donnafred Hoff
Russell P. MacFall
Harold L. McCleery
Richard M. Pearl
Henry P. Zuidema

Published bi-monthly at Mount Morris, Ill., by The Earth Science Publishing Company, Inc., Advertising and Circulation Offices, Box 1387, Chicago, Illinois. Editorial Office, 406 Grover Street, Joliet, Illinois. Subscriptions: \$2.50 per year, 3 years \$6.00, United States and Canada. Elsewhere \$3.00 and \$7.50. Advertising rates sent upon request. EARTH SCIENCE is receptive to articles of Earth Science interest. Manuscripts, photographs, sketches will not be returned unless accompanied by ample first-class postage. Permission to quote or reprint articles from this magazine will be considered upon written request. Communications for editorial consideration should be sent to Ben Hur Wilson, 406 Grover St., Joliet, Illinois. The Earth Science Publishing Company makes every effort to select its articles and advertising carefully in order to merit the confidence of our readers, but assumes no responsibility for the statements and opinions expressed by contributors and/or advertisers in the magazine.

Formerly
Earth Science Digest

CHANGE OF ADDRESS

Subscribers should notify their Postmaster, and the Earth Science Subscription Department at least thirty days before change is to take place. Both old and new address should be given to assure promptness and accuracy. Postmaster: Send Form 3579 to P.O. Box 1387, Chicago, Illinois.

Published Bi-monthly: February, April, June, August, October, December

Second Class Postage Paid at Mt. Morris, Illinois
Copyright 1961 by The Earth Science Publishing Company, Incorporated. All rights reserved.

BARGAIN DAYS ARE HERE AGAIN!

Jewelry Findings and Cut Stones

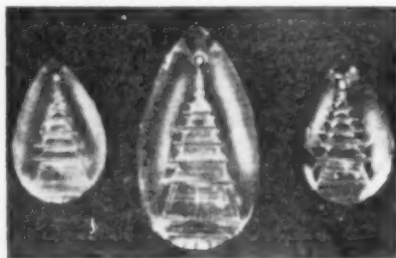
ITEM	DESCRIPTION
1	18" NECKCHAINS Complete with Spring Ring, 18 kt. Gold or Rhodium Plate, 15¢ each; \$1.00 dozen
2	14" NECKCHAIN of Anodized Aluminum—Gold or Silver—the Very Best in Aluminum Chain, 15¢ each; \$1.50 dozen.
3	18" NECKCHAINS—Soldered Link Fine Chain—18 kt. Gold Plate or Rhodium Plate, 30¢ each; \$3.00 dozen.
4	6mm HALF BALL DROP EARSCREWS—18 kt. Gold or Rhodium, 10¢ pair.
5	6mm HALF BALL DROP EARWIRES—Sterling Silver, 25¢ pair.
6	DAINTY HEART DESIGN EARWIRES FOR PIERCED EARS—Gold Filled, 20¢ pair.
7	18 KT. GOLD FILLED LADIES RING—Takes 13x18 Cabochon, \$1.70 each.
8	BAILS FOR EARRINGS—Gold or Rhodium Plate, 25¢ dozen; \$2.75 gross.
9	BAILS FOR PENDANTS—Gold or Rhodium Plate, 25¢ dozen; \$2.75 gross.

10 OPAL OR GEM BALLS—9/16" Dia. Plastic ball with press fit cap with eye for hanging on chain, 30¢ each; \$3.00 dozen.



ROCK CRYSTAL STARS

For Earrings and Pendants
14, 75¢ Each; 22, 95¢ Each



Three Dimensional

Rock Crystal Pagodas

Hand carved on the back to show a very realistic pagoda. Don't ask us how they do it. It's an oriental secret!

Small size, \$1.25 each.
Large size, \$2.35 each.

EMERALD SPECIMENS

6 to 10 pieces, over 10 carats, Colombian emerald crystal pieces. A fine addition to your specimen collection and enough left over for trading material. Emerald specimen crystals \$1.00.

SMALL EMERALD PIECES

Over 10 carats of small Emerald Chips suitable for gem balls. Gem Ball Emerald 50¢

SPECIMEN MATERIAL

Selenite Roses—Texas approx. 1 1/2" complete rose formation 35¢ each
Peacock Copper Pyrite—Colorado colored crystals approx. 1 1/2" add color to your collection. 35¢ each
Calconthite—Artificially produced beautiful Blue Copper Sulphide Crystal Groups. A unique addition to any collection 1 1/2" size 35¢, 3" size 75¢

Alunite—Artificially produced Aluminum Oxide Crystals of deep purple and lavender. Approx. 1 1/2" 35¢
Iron Pyrite—Fool's Gold—Mexico. If your collection doesn't include this material—it should.
1" size 25¢ 2" size 50¢ 2 1/2" size 75¢ 3" size \$1.00

FACETED STONES

We have a large stock of round brilliant, emerald cut and oval brilliant cut Amethyst, Citrine, Peridot, Alexandrite, Zircon, Ruby, Sapphire and many others. Let us know what you want and we will quote the lowest prices ever offered. Make us prove it!

HARRY E. LEWIS

6421 S.W. 41st STREET

MIAMI, FLORIDA

Editor's Memo Pad



EARLY CLUB HISTORY

RICHARD PEARL'S item, "American Federation Beginnings," published in our February issue has elicited some inquiry on the part of our readers concerning the early history of our present day Mineral Club movement.

As a matter of fact, the present great wave of Earth Science enthusiasm is not the first, but the second such—an earlier one having developed on a much smaller scale about the middle of the 19th century, which was confined wholly to the region east of the Alleghenies. This perhaps was the result of the emergence of the embryonic science of geology and its many attendant sub-branches to the status of a well established, dignified science.

As long ago as 1828, Phillips published a well organized text on Mineralogy, and in 1832 John L. Comstock, of Hartford, Connecticut, wrote a text entitled "An Introduction to Mineralogy," which gave the subject its first real boost. In 1873, Dr. A. C. Mamlin wrote a notable work on tourmaline, and in 1884 he produced his sublime work "Leisure Hours Among the Gems," which did much to inspire the gem and mineral collecting hobby, and which until this day has seldom been improved upon.

The following year, in 1885, Dr. Joseph H. Hunt of New York City, became president of a Mineral Club sponsored by the Brooklyn Institute, which was the earliest club of which we have any accurate record. The same year the Spencer Bair Mineralogical Society was founded in Philadelphia, and the following year the New York City Mineral Club came into existence. A number of other clubs and societies were soon formed, more than twenty all told, it is said, springing up along the Eastern Seaboard during the last quarter of the century.

At least two collectors' magazines also came into being and were published during the height of the epoch, neither of which long survived. Bound copies of same, however, are now on the shelves of

the John Crerar Reference Library of Chicago where they may be consulted by all midwesterners and others who may desire to do so.

As might be expected all this activity naturally was supplemented by the usual collecting craze and of course dealing commercially in minerals brought a number of firms into existence, one in particular becoming widely and favorably known, the A. E. Foote Naturalist Establishment, begun in the early 70's, being the forerunner of the great Foote Mineral Company, of Philadelphia. Practically all of our better older collections contain many rare mineral specimens bearing the famous Foote label.

Eventually, for some unaccountable reason, this club enthusiasm waned, and one by one all these clubs excepting three, passed out of existence and the movement lay practically dormant, excepting for individual collectors, for nearly a quarter of a century. Only the New York, the Philadelphia and the Washington, D. C. clubs withstood the ravages of time, remaining active to the present day. This was due perhaps to the fact that they were more professional in character, than of the amateur type now so prevalent.

Strange as it may seem, the renewal of the great Earth Science hobby club movement as it exists today, is in several respects the result of the great depression of the late 20's and early 30's of the present century. The story as we have it is substantially as follows.

Peter Zodac, then a young mining engineer working in the coal fields of Pennsylvania, found himself temporarily out of employment. Being also an ardent mineral collector and hobbyist he was encouraged by some of his friends living in his home town, Peekskill, New York, to undertake the publication of *Rocks and Minerals*, a quarterly journal, in 1924. It succeeded beyond his wildest expectations, there being none other in the field at the time, and soon he began printing it as a monthly magazine, now the oldest in the field.

In 1928, 'ye Editor' of Earth Science became a teacher in the Earth Science Department of the Joliet Township High School and Junior College, and immediately began sponsoring a Junior Mineral Club among his High School students which soon became quite popular. The following year he teamed up with Peter Zodiac, using "Rocks and Minerals" as a medium, in organizing other Junior Clubs throughout the nation,—some thirteen in all becoming activated as a result of their joint efforts.

So encouraging were these results, that in 1930 an adult club was organized in the Geology Department of the Joliet Junior College, and the Mineralogist Society of Joliet, we believe, became the first adult club so organized and to function west of the Alleghenies. At about the same time, in 1931, the Mineralogical Society of Southern California was organized in Pasadena, and a year or so later the Oregon Agate and Mineral Society came into being. These three clubs no doubt thus became the Founding Societies of the present great surge of Earth Science Hobby activities of all kinds that is now sweeping the entire country. It is estimated that there must be at least 500 such clubs functioning throughout the Nation, and what a great movement is this for one to be associated with.

N.B. Further information concerning the early history of our Earth Science Federations will follow in our June issue. Watch for this interesting sketch.

LETTERS OF INTEREST

Dick Lake, Membership Chairman of the Midwest Federation writes—

Dear Friends:—It is the pleasant duty of the Midwest Membership Committee to help all the young or unaffiliated societies in our area if possible. We have many aids for those who are starting clubs and for the new unaffiliated clubs of the Midwest.

Older club members may help these new groups by telling them about the work of our Committee, and that kits are sent out free for the asking, containing valuable information and helps in organizing a new club. With more than 100 member clubs now affiliated, the Midwest Federation has more than doubled in number in the last three years, and the end is not now in sight. Please call on us if we can help you get started. Richard Lake, Chairman, P.O. Box 361, Chisholm, Minn.



Russell Kemp

ANNOUNCEMENT

It is with pleasure that we announce that our good friend Russell Kemp has joined us as an Earth Science associate and will assume an active part in the management of the magazine as Promotional Director.

As an individual he is widely known in Midwest circles, and his interest in Earth Science activities are also on a nation-wide level. Both he and his talented wife, Doris, however, are real "grass-root" Rockhounds having long taken an active part on the local club basis as faithful members of the Chicago Lapidary Society and as officers of the National Bulletin Editors Association, and numerous other worthwhile endeavors.

As we continue to grow, and to improve and expand our services in the future you may be assured that "Russ" will have no little part in this program.

EXHIBIT OF GEMS & MINERALS

The Lincoln Orbit Earth Science Society, the Central Illinois Rock Club and the Siloam Springs Rock and Mineral Club will have an exhibit of gems and minerals on April 15 and 16 in the Sangamon County Junior Fair building in New Berlin, Illinois. Public invited.

May 13 and 14. 3rd Annual Exhibit of the Illinois Valley Rockhounds will be held at Pekin, Illinois. There will be displays of Rocks, Minerals, Fossils and Gems.

For information contact: Illinois Valley Rockhounds, P.O. Box 142, Pekin, Illinois.

Important Coming Events—1961 FEDERATION SHOWS

- June 9, 10, and 11. Texas Federation of Mineral Societies.** Annual Convention and Show. Armory, Wichita Falls, Texas. **North Texas Gem and Mineral Society**, host.
- June 9, 10, and 11. Rocky Mountain Federation of Mineralogical Societies.** Convention and Show. Industrial Building, Fair Grounds, Casper, Wyo. Noon to 10 p.m. each day. **Natrona County Rockhounds Club**, host.
- June 23, 24, and 25. California Federation of Mineralogical Societies.** 22nd Annual Convention and Show, Los Angeles County Fairgrounds, Pomona, Calif. **Four San Fernando Valley clubs**, hosts.
- Aug. 10, 11, 12, 13. American Federation of Mineralogical Societies and Eastern Federation of Mineralogical and Lapidary Societies.** Combined Convention and Show, Municipal Auditorium, Miami, Fla. **Gemcrafters of Miami**, host.
- Aug. 31 thru Sept. 4. Northwest Federation of Mineralogical Societies.** 21st Annual Gem and Mineral Show in conjunction with the Southeastern Washington Fair and Rodeo, Exposition Building, Walla Walla, Wash. **Horseheaven Gem and Mineral Societies**, hosts.

MIDWEST HIGHLIGHTS

- June 29 thru July 2. The Tri County Rocks and Mineral Society, Inc.**, of Saginaw, Michigan, will be host to the Twenty-First Annual Convention of the Midwest Federation of Mineralogical and Geological Societies, at Saginaw County Fair Grounds. For complete information see page 58 ad in this issue.

MIDWEST ROCKRAMAS

At present it appears that there are at least two Midwest Sub-Regional Rockramas on the calendar for 1961. One in the Northern Sub-Region to be held at Wausau, Wisconsin, under the auspices of the Rib Mountain Gem and Mineral Society, and the other in the Central Region, at Indianapolis, the Indiana Geology and Gem Society serving as hosts.

Rockramas, as we know, are more than local shows, and compare favorably

with the annual Midwest conventions. Their purpose is to widen the opportunity of our widely scattered Clubs located in some twelve or thirteen states to attend and take part in a big show without traveling many hundreds of miles. Dates for these shows are not available at the present time so watch for more detailed information concerning them in our forthcoming June issue

MIDWEST INDIVIDUAL CLUB SHOWS

- March 18-19. Wisconsin Geological Society of Milwaukee** will hold their Gem Show, Blatz Memorial Building, Lincoln Park, Milwaukee, Wis. For information contact: Mrs. Paul Fuller, 3252 N. 81st St., Milwaukee 22, Wis.
- April 14, 15, and 16. Central Nebraska Rock and Mineral Society.** Seventh annual Rock Show. National Guard Armory, 2015 West 3rd, Hastings, Nebr. 9 a.m. to 9 p.m. For information contact: Mrs. Pat Hill, Sec., Hastings, Nebr.
- April 14, 15, and 16. Sac & Fox Lapidary Club of Oskaloosa, Ia.** will hold a Gemshow, Ottumwa, Iowa (building unknown at this time), April 14 for school classes only; public, April 15-16. For information contact: Mary E. Stitely, 1230 C. Ave. E., Oskaloosa, Ia.
- April 15-16. Wisconsin Geological Society of Milwaukee** will hold Field Trips. Meet at Dodgeville, Wis. Leave promptly at 10 a.m., April 15. Will collect: Galena, sphalerite, calcite xls, and Lake Superior Agates. Send card notice at least 5 days in advance of outing to: Mrs. Paul Fuller, Sec., WGS, 3252 N. 81st St., Milwaukee 22, Wis.
- April 21-22-23. Sac & Fox Lapidary Club of Oskaloosa, Iowa**, will hold a Gem Show. Farm Bureau Building, Oskaloosa, Iowa. April 21 for school classes only; public April 22-23. For information contact Mary E. Stitely, 1230 C. Ave. E., Oskaloosa, Iowa.
- April 22 and 23. Wichita Gem and Mineral Society.** 8th Annual Show. East Armory, 620 N. Edgemore, Wichita, Kans. For information contact: Clarence Reaugh, 1733 Fairview Ave., Wichita 3, Kansas.

May 13-14. The Mesabi Rock & Mineral Club of Minnesota will hold Field Trips. Meet at Chisholm, Minn. Leave promptly at 8 a.m., May 13. Will collect Iron Country minerals, including Lake Superior agates. For complete information contact Richard Lake, Box 361, Chisholm, Minn.

May 19-20-21. The Chicago Lapidary Club will hold their Eleventh Annual Amateur Crafted Gem and Jewelry Competitive Exhibition. Ridge Park Field House, 96th and Longwood, Chicago, Ill. May 19-20, 7-10 p.m.; May 21, 12-8 p.m. For information contact Mrs. John Kurgan, Sec., 12602 S. Justine, Chicago 43, Ill.

May 27-28. The Ishpeming Rock & Mineral Club, Inc., will hold a Field Trip Meet at National Ski Museum, Ishpeming, Mich. Leave promptly at 8 a.m., May 27. Will collect pyrolusite, aphisiderite garnets, magnetite, limonite pseudos, and a host of Iron County minerals. Send card notice to Mrs. Marian Markert, 107 W. Ridge St., Ishpeming, Mich.

June 3-4. The Kalamazoo Geological and Mineralogical Society will hold a Rockfest at the Kalamazoo County Center Building, Lake Street, Kalamazoo, Michigan. For information contact Mrs. W. Spafford, 9511 Woodlawn Drive, Kalamazoo, Michigan.

ILLINOIS GEOLOGICAL SURVEY Earth Science Field Trips, Spring 1961.

April 15th, Sparta, Randolph County

The Sparta region, underlain by coal-bearing rocks, has long been an important coal producing area. There are several large strip mines nearby. West of Sparta, Mississippian limestones, shales and sandstones crop out. Assemble at Sparta High School, 9 a.m.

May 6, Hamilton, Hancock County

Hamilton is in the heart of the famous geode collecting area. These geologic curiosities contain crystals of a variety of minerals, and there will be an opportunity to collect geodes and fossils. Assemble, Hamilton High School, 9 a.m.

May 20, Morris, Grundy County

We will be near the Mazon Creek and Braidwood plant fossil collecting areas as well as several good quarries and outcrops where animal fossils are abundant. Assemble at Morris High School, 9 a.m.

Your attendance is encouraged without previous arrangement.

RIP RAP

The ocean is looked upon more and more as a fertile field for research. Federal funds for oceanography are estimated at \$16,703,000 in fiscal 1961, up one-third from last year. Funds for solid earth sciences (geology, geochemistry, geophysics, and paleontology) are estimated at \$33,408,000 in fiscal 1961, about the same as last year. . . . A test site for drilling into the sub-ocean crust of the earth has been chosen near Guadalupe Island off the western coast of Mexico. Depth of the ocean at that point is about 2.3 miles. This experimental drilling is expected to show whether an unmoored ship can be kept in place by means of large outboard motors, and how the equipment considered for the forthcoming major Mohole probe may be expected to perform.

Future supplies of major metals are under study by Resources for the Future. Iron, aluminum, copper, lead, zinc, and manganese will be surveyed. Another study in progress covers aspects of the long-term policy position of the United States with respect to foreign trade and the relationship between domestic production and imports.

Charges of "dumping" made against Canada by 3 U.S. feldspar producers were rejected by the U.S. Tariff Commission. The complaint was made because Canadian producers of nepheline syenite quoted the same price, in dollars, to both Canadian consumers and U.S. importers. Although the lower value of the U.S. dollar compared with the Canadian dollar gave the U.S. buyer some price advantage, the Commission found that this did not constitute intentional "dumping." The Canadian companies have now revised their price structure to allow for the exchange difference.

Over in Bombay the Motiwala Brothers are actively engaged in promoting the products of their native India. We have recently been favored with a list of their offerings along with "our hand of friendship . . . will you like to shake it?" An agate stone with a drop of water entrapped inside and a "shaking" stone that drinks water should appeal to collectors. The ancient Indian Kundan work is said to be a challenge to lapidaries: "In this art stones are embedded on gold jewellery piece in such a way that it is not possible to understand how the stone is fixed."

Our Authors



DR. EDWARD H. KRAUS

DR. EDWARD H. KRAUS is Dean Emeritus, College of Literature, Science and Arts, University of Michigan, and is certainly among the most widely known and highly respected mineralogists in the world. He is a graduate of Syracuse University and received his Ph.D. degree at the University of Munich in 1901. His association with the University of Michigan began in 1904 as an assistant professor of mineralogy, and he held successively more responsible positions until his appointment as Dean in 1933.

Although retired, Dr. Kraus has kept in close touch with the field of mineralogy and his scientific studies and writings (now numbering over 100 books and articles) have continued unabated.

PROF. BURKE SMITH, Jr., author of our article on Stonehenge, is a well known biologist in the Midwest. He has contributed a number of fine articles to this and other magazines and bulletins in the past and has lectured extensively on the subjects of Paleontology and Biology. He holds a Master's Degree from the University of Chicago, and is now teaching at the Illinois Institute of Technology. His extensive trip through the British Isles last year inspired him to write this article about Stonehenge, which though much written about, still provides much room for speculation concerning its date and conditions of origin.

**June issue ad deadline
is April 10th!**

Midwest Club News

Mrs. Bernice Rexin, Club Editor
3934 N. Sherman Blvd.
Milwaukee 16, Wisconsin

COLUMBUS ROCK AND MINERAL SOCIETY on January 27 held its second annual competitive exhibit for junior members. The Michael Cenci Memorial Trophy was won by 11 year old Linda Hankey for her winning entry of minerals and man's use of them. It was presented to her by George Maher who won it in 1960 for his outstanding display of fossils. This award is given in memory of Michael Cenci who died in 1959 at the age of nine years. Michael was an enthusiastic member of the society and his brief life was brightened by collecting and studying fossils which he dearly loved.

LINCOLN GEM AND MINERAL CLUB is sponsoring a series of lapidary classes for its members. A favorite medium of the student lapidaries is Fairburn agate which the club collects on its annual trip to the rock beds at Crawford and Orella, Nebraska.

BLACK HAWK GEM AND MINERAL SOCIETY OF IOWA has accepted the invitation of the Tri-State Gem and Mineral Society of Dubuque to join it for a two-day get-together during May. Members of the clubs will be divided into three groups for field trips. One group will be for those interested in agates, a second for members who want to collect minerals and the third group for fossil hunters. Swap fests, brag sessions and an informal program are planned. All societies near Dubuque, Iowa have been invited to participate in this event.

BLACK HAWK GEM AND MINERAL CLUB OF ILLINOIS held an exhibit of gems, minerals and fossils at its January meeting and awarded prizes for the displays judged best by its members. The club recently celebrated its sixth birthday and looked back on a history of numerous field trips and frequent displays. It covers the quad-cities, Moline and Rock Island, Illinois and Davenport and Bettendorf, Iowa.

MINERALORIST SOCIETY OF JOLIET had the pleasure of hearing guest speaker, Dr. Carel Otto, research chemist for the Pure Oil Laboratories at Crystal Lake, Illinois, talk on the subject, "The Geology of Oil." He covered the matter of its origin and the geology of its accumulation in a very thorough manner, at their January meeting.

(Continued on page 79)

MIDWEST FEDERATION GEMS AND MINERALS FAIR AND 21ST ANNUAL CONVENTION

Saginaw County Fair Grounds, Saginaw, Michigan
June 29, 30, July 1, 2, 1961

The Tri-County Rocks and Minerals Society, Inc. of Saginaw, Bay, and Midland Counties, Michigan, extend a most hearty invitation to the 94 member clubs of the Midwest Federation of Mineralogical and Geological Societies to participate in the 1961 Gems and Minerals Fair. Fifty thousand square feet of floor space have been reserved for your use with an additional 8,000 square feet to be held in reserve. Five buildings for sure, and a sixth in reserve. Will we need this much space? Yes, if you, the member societies and the individual members of the Federation, support the Federation and your annual show.

This is your chance to show the Federation that yours is an active society. This is your chance to prove to yourselves that it's fun to belong, to make new friends, to meet old friends, to see the best of the Midwest collections on display. This is a chance for bulletin editors to get together, to sit down at the annual banquet to a wonderful meal, and top it off with a most distinguished and famous "Mid-Westerner" as guest speaker—the fabulous June Zeitner of Mission, South Dakota.

Send in your reservations as soon as possible to the following chairmen:

Society and Individual Exhibits

DONALD L. SOMMERFIELD
1423 North Carolina
Saginaw, Michigan

Commercial Space

DORIS L. SPRAGUE
11307 Swan Creek Road
Rt. 5, Saginaw, Mich.

Junior Exhibits

WILLIAM FORBES
403 Tittabawassee
Zilwaukee, Mich.

Judging and Awards

EVERET CAVER
523 N. Jackson St.
Bay City, Mich.

Editors Breakfast

ALICE KRAMER
303 Harrison St.
Midland, Mich.

Special Exhibits

HARRY H. SPRAGUE
11307 Swan Creek Road
Rt. 5, Saginaw, Mich.

Banquet

DORIS L. SPRAGUE
11307 Swan Creek Road
Rt. 5, Saginaw, Mich.

Registration

CORNELIA DEMERRITT
1913 Essex St.
Saginaw, Mich.

Hospitality

CECILE JOHNS
4484 King Road
Saginaw, Mich.

Publicity

DR. B. H. VAN HORNE
1314 Wallen St.
Midland, Mich.

Program

SCOTT WILSON
297 Donaghue Beach
Bay City, Mich.

Housing

ELLEN B. SMITH
1413 Sixth St.
Bay City, Mich.

All societies are being circularized with complete information. All other interested parties please contact the General Chairman, Harry H. Sprague, 11307 Swan Creek Road, Rt. 5, Saginaw, Mich.

Midwest's President Has A New Gavel

by W. H. de NUIE



A Memorial to Gus H. Brown

IN the early months of 1960, Dency Brown was the Midwest Federation's Social Courtesy Chairman. At that time, as we all know, she was the wife of our good friend, that dedicated supporter of Midwest, the late Gus Brown of the Des Moines Lapidary Society. Inasmuch as 1960 was the Midwest's 20th year, Dency and Gus came up with the idea that a sort of anniversary present would be a nice thing to present to the MWF at the Ishpeming Convention and decided a president's gavel would be an appropriate and proper gift. They did me the honor of

selecting me to design and make the gavel, and I immediately went to work on it. Unfortunately the material I used turned out unsatisfactorily, and as there wasn't time enough before the convention to do the job over, it was decided to put the matter off until fall; so there the project rested.

Meantime, Doris Kemp had taken on the responsibility of Social Courtesies and promptly revived the project. We are happy to report it was brought to a conclusion in time for presentation at the first 1961 Midwest Executive Committee Meeting held in

March at Downers Grove, Illinois. At this meeting the gavel was officially presented by Doris Kemp to President Floyd Mortenson. It was understood that this gavel will be presented to each new president at the Annual MWF Banquet held in conjunction with the Annual Convention for usage during his term of office.

In view of the Browns' ardent and enthusiastic support of the Midwest's activities, and the further fact that the idea of making and presenting a gavel originated with them, it was decided, with Dency Brown's approval, to dedicate the gavel as a memorial to Gus Brown. The dedication plate reads as follows:

Dedicated to the Memory of
Gus H. Brown
for Outstanding Devotion to the
Midwest Federation

The contributors to this project hope their gift will keep green the memory of a good friend; we think it will be especially appropriate and helpful when the Executive Committee deliberates Midwest's problems and makes its decisions, to have before it a reminder of the dedicated attitude and enthusiastic participation heretofore brought to these meetings by Gus H. Brown.

The head of the gavel is made of grey-green Jade with the MWF symbol and dates sandblasted and gilded. The handle is rosewood; box is walnut with red velvet liner; dedication plaque of bronze.

In making Midwest's new jade gavel, the only new problem lay in getting the two protruding bands at the ends of the head to run in a true circle around the head. With our old hand-assembled saw I was finally able to mount the jade blank (an octagonal block 2½ inches long) in the clamp in such a manner that it could be turned, without other motion, while the saw cut a pair of parallel grooves on each end of the blank. This action was similar to placing the blank in a turning lathe, and using the saw as a grinding tool. These grooves were perfectly circular and equally spaced. After cut-

ting them, the freehand grinding to final shape was relatively simple, using the grooves as guidelines.

Sanding was done as much as possible on our regular sanding drums. Where necessary to get into corners, etc., I used our Dental Laboratory flexible shaft (a wonderful asset to any shop) with 1-inch disks of carborundum cloth of graduated grades. Polishing was started on a felt buff with tin oxide and finished on a sole-leather buff with Linde A powder.

Striking surfaces are faced with Vinyl tile. This material (though soft) grinds and polishes under water exactly as jade does. The MWF emblem and the dates (on opposite sides) were etched by sandblasting, as described in EARTH SCIENCE, February, 1960. However, since this does not show up well on other dark material, I experimented with white, silver and gilt paint, and after comparing samples, filled in the etching with gilt. The handle, turned from rosewood by a woodworking friend, is mounted with epoxy cement. Paul Saylor, president of our Minnesota Mineral Club, was kind enough to drill the half-inch hole to take the handle, we having no drill in our shop at the time. Paul also assembled the wood portion of the box for me. Really the toughest part of the whole job was installing the velvet liner in the box, nor, in my opinion, did it turn out too well. Velvet in such small pieces is stiff and springy as wire screen, and creeps as it is applied under pressure. Furthermore, the "nest" is cut in styrofoam, and every adhesive we had in our shop simply dissolved cavities into it. Finally used ordinary mucilage, which didn't harm the styrofoam.

I find a great deal of pleasure in carving jade—do quite a bit of it—but the making of this gavel, being for Midwest and in memory of Gus Brown, was a particular treat.

N.B. For those who might like further information concerning Gus Brown, and his efforts in behalf of the Midwest Federation, refer to our August, 1960 issue, pp. 128-9.

Excavating Ree Indian Sites

By JUNE CULP ZEITNER

ALONG the Missouri River of South Dakota, where once the Ree or Arikara Indians lived, the government is now constructing huge dams which shortly will inundate thousands of acres of land. Groups from Universities and museums, besides private individuals, are being encouraged to dig for artifacts which if not recovered now may be permanently lost.

The Arikaras were not related to the Sioux. Ethnologists think they may have been related to the Pawnees or perhaps even the Aztecs. They lived in our area in the 17th century. They lived in oval-shaped lodges instead of tepees and their villages were permanent.

The chief occupation of these people was agriculture. They raised maize or corn, squash, beans, and tobacco. Much wild fruit grew then as now along the river. Hunting and fishing also supplemented their diet.

Epidemics such as smallpox all but destroyed the tribe in the 19th cen-

tury. The last few intermarried with the Mandan of North Dakota so at the present time Rees no longer exist as a separate American Indian tribe.

Many interesting sidelights of life among the Rees are coming to light as the excavations progress. The artifacts being uncovered are exceptionally good.

Arrowheads are symmetrical and finely chipped. They vary in size from bird points of $\frac{1}{2}$ inch to big game points of 3 inches or more. The materials used seem largely from the Badlands of western South Dakota as the Missouri River basin area is not highly mineralized. Chalcedony was a favorite stone; some points are petrified wood, others are jasper, carnelian, flint, agate, quartzite, and quartz. Spearheads made of the same materials are up to 5 inches in length. Perhaps the most beautiful examples of their work are the delicately carved stone fishhooks.

Photos: Courtesy W. H. Over Museum, University of South Dakota.



Arikara Earth Lodge, Swan Creek Village, Missouri Valley, South Dakota.

Stones found other uses in the daily life of the Ree. Well sharpened and shaped stones were used as hide scrapers. Knives, axes, hoes, and hammers were made of stone. Mortars and pestles of stone ground their corn. Both war clubs and peace pipes were made of stone. Hematite, limonite, charcoal and chalk were used as paints. Sandstone, or scoria was used for abraders and polishers. Clay was used for pottery. Stones also were used for personal ornament. Many beads have been found of catlinite and copper, indicating these Indians traded extensively with other tribes.

After stone the next important tool material to these people was bone. Here again the artistry of this tribe seems very advanced. Some of the skillfully-shaped bone tools were highly polished.

Beads, whistles, diggers, awls, arrow shaft wrenches and knives were made of bone. Handles for stone knives were made of bone. Large flat bones were used for hoes or spatulas. Compression flakers were made of antler tips. Buffalo horns made spoons and ladles.

Many pieces of worked bone have been found which so far there are no answers for. Some items like whole teeth of buffalo or elk and claws of birds such as hawk or eagle, were probably used in ceremonials but we cannot be sure.

Deer antlers found in the excavations may have been rakes. One tool was used for flattening porcupine quills. "Snow snakes" used in a game were made of antler tips. Antlers were also used for fish spears.

Some worked rib bones seem to have been used for a type of calender. Needles are made of bone. Often a bone apparently used as a comb turns up.

Clams from the river also played a part in the life of these Indians. Probably they ate the clams. Then the shells were used for spoons, ladles, dishes and particularly for personal adornment. Pendants, beads, amulets of shiny iridescent clam were extremely popular.

The Ree pottery was made of native clays. Most of it is dark although some light brown pieces are found. Much of the pottery was decorated with ge-



Human Skeletons, Swan Creek Village, Missouri Valley, South Dakota.

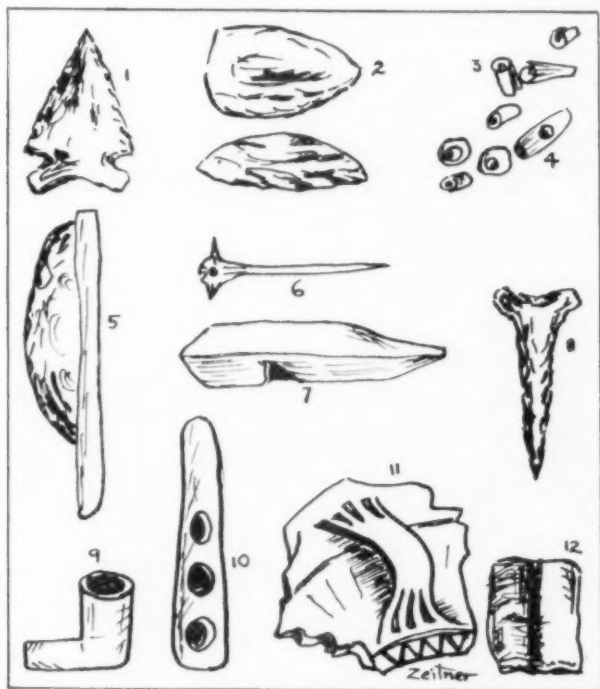
ometric patterns. Although most of the pottery is broken we can easily see that it was artistically made for people who liked utilitarian objects to be beautiful as well. Fragile appearing handles were attached so firmly that the handles themselves are seldom broken. Intricate patterns were even carved in the handles.

The charred corncobs often found in the excavations are seldom more than $\frac{1}{2}$ inch in diameter, or 2 inches in length. Tiny kernels were in 8 rows. Charred squash and plum seeds are found in fire pits.

The Rees were a highly cultured group of people, living a peaceful and comfortable life when the first white men found them in the early 1700's. Less than two centuries later the tribe

was extinct. However they have left their mark on the history of this land. Even Lewis and Clark write about meeting the Ree Indians.

It is hoped that the extensive salvage work now taking place will furnish ethnologists with a more complete history of the origin, movements, and accomplishments of this little known tribe. The Smithsonian is directing much of the recovery work. Archeologists from the University of South Dakota are also active. Members of the State Fish, Game, and Parks Commission are also helping with this work on their own time. It is hoped that when the digging is over and the lands flooded with water that a museum or suitable memorial will be erected in the area commemorating the Ree Indians.



Ree Indian Artifacts: 1. arrowhead; 2. hide scraper, top and side view; 3. native copper beads; 4. bone beads; 5. chalcodony knife with bone handle; 6. cattfish spine awl; 7. bone whistle; 8. drill; 9. pipe; 10. arrow shaft wrench; 11. pottery rim shard; 12. abrader.

IN MEMORIAM

IT is with deep regret that we note the passing of Dr. A. L. Inglesby of Fruita, Utah, in November 1960. Few collectors in the entire country were better or more favorably known than Dr. Inglesby, and his own private museum in his home in the Capitol Reef National Monument was one of the most outstanding in private hands.

Dr. Inglesby, "Doc" as he was affectionately known by his hundreds of friends, was a most versatile individual, being a dentist, a miner, stage line operator, prospector, gem and mineral collector and just plain rockhound.

A graduate of Northwestern University Dental College, he arrived in Utah in 1900. He first located in Murcur, and later in Bingham, and was the driving force in the creation of the Capitol Reef National Monument which deed alone will memorialize him for many long years to come.

An inveterate collector, he contacted and traded with dealers all over the country, and many beautiful specimens, especially of Utah petrified woods, may be seen in practically all the great museums and in many of the better private collections. He will be greatly missed in mineralogical circles.

AMBER LORE

by LILLIAN MIHELICIC

AMBER may be only a fossil wood but it has been a prime favorite with the peoples of all ages, extending well backward into the vast eons of time before Homer into the present age. Discoveries of amber in the barrows of prehistoric people indicate that it was regarded as valuable and as precious as gold. Here it was frequently found in the form of necklaces seeming to indicate that they were to be used by the owners in the world into which they had passed. These early beads were but lumps of amber with holes drilled through them.

Pliny states that it was regarded as possessing great medicinal value as a

preventative of delirium, weak eyes and ailments of the stomach. The original purpose of amber mouthpieces was talismanic — a guard against infection. The ancients were aware of its electrical susceptibilities and gave it the name "electrum."

The Romans considered amber in high esteem as a talisman against danger and witchcraft (a danger considered then even more real than at the present time). These charms frequently took the form of figurines and if the amber contained an insect it was most highly prized.

Certain museums in Europe have in their possession complete cups made of amber. The Chinese frequently make an amber incense. The astrologers are not too positive of the place of amber but in most cases it is placed under the influence of Leo.

Mineralogically, amber is considered a non-metallic, in the same class as petroleum and asphaltum. Frequently a bit of sulfur in certain ambers is found, and at times pyrites are formed in it. Then, of course, there are the entrapped insects, twigs, feathers, and straws. What a study of botany and zoology is possible here!

Amber has been found all over the world. Some of it in the United States, in the green sands of New Jersey, for instance. But the most important source of all is the Baltic shore line, particularly along East Prussia. This amber is known as succinite, a source of succinic acid. It is the favorite trade amber of a yellow color. The ivory colored is known as bone amber. The most colorful is simetite, a Sicilian amber that may be deep red, blue, or green. Rumanite, a Rumanian amber found in carbonaceous sandstone, is frequently iridescent. Burmite amber comes from Burma. Jet, at one time, was considered a form of black amber.

Amber is light, insoluble in water and gives off an aromatic odor when heated. When crushed into a fine powder, it is soluble in sulfuric acid. It can be mixed with alkali to form a liquid soap.

Albert E. Foote, M.D., Naturalist

by EDWARD H. KRAUS*

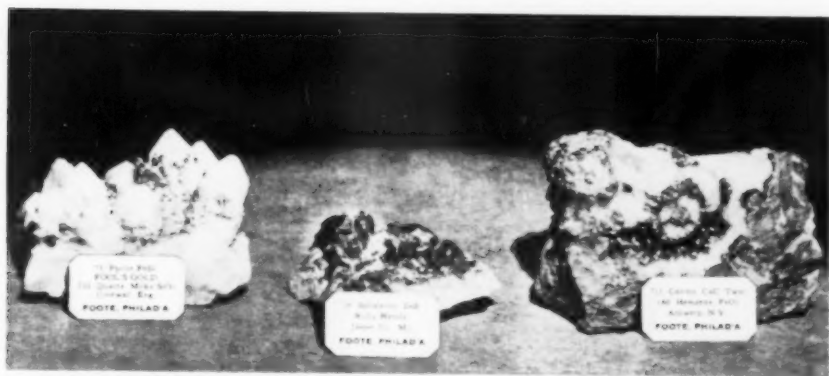
*"HE has done a special work for mineralogy in this country which entitles his name to honor and regard. The great business that he has built up, and administered, we trust may be equally successful."***

The man referred to is Dr. Albert E. Foote, a graduate in medicine from the University of Michigan, who turned away from medical practice in favor of teaching. His career as scientist, naturalist, and entrepreneur was comparatively brief—he died, in 1895, at the age of 49. But within that span of years he had created a considerable following among scientists and had established a business which was destined to survive him. Foote Mineral Company still bears his name—and, some 83 years after its founding, still bears the imprint of the energetic and dedicated naturalist who established the Company as an extension of his own academic curiosity.

Albert E. Foote was born in 1846 at Hamilton, Madison County, New York. His ancestors were among the earliest settlers of Massachusetts, some of whom were active in the Revolutionary War. One of them, James Otis, was a signer of the Declaration of Independence.

Following a period of study at the Academy at Cortland, New York, young Foote attended Madison University, now Colgate University, and Harvard University, where he specialized in the sciences. In February, 1865, he entered the literary department, now known as the College of Literature, Science, and the Arts, of the University of Michigan as a student pursuing "selective studies." In the following September he was admitted to the Medical Department and received the degree of Doctor of Medicine on June 25, 1867, at the age of 21.

After receiving his M.D. degree, young Foote, who had demonstrated marked efficiency in chemistry, was given an assistantship in the department and served in that capacity until June, 1868. He was then appointed Assistant Professor of Chemistry at the Iowa State Agricultural College at Ames, where he had the responsibility of developing the department. In 1869 the College granted Foote a leave of absence, which permitted him to visit agricultural colleges, laboratories, and museums in England, France and Germany. After his return to Ames he was successful in developing a well-equipped and efficient laboratory,



The famous Foote label on mineral specimens was valued for two sterling virtues—the data it gave was correct; and the glue Dr. Foote used to fix it to the mineral never seemed to lose its grip.

which at that time was considered to be one of the best in the country. In 1871 he was advanced to full professor.

Early in life Albert Foote became intensely interested in minerals, as well as in all phases of natural history. He was an ardent collector. In the summer of 1868, with a party of thirteen students from the University of Michigan, he spent five months exploring the country around and north of Lake Superior. In this endeavor he succeeded in advancing the knowledge of the natural history of the region and also in collecting many valuable specimens. While at the Iowa State Agricultural College Foote continued his interest in minerals and made numerous collecting trips to the Lake Superior area, Arkansas, New Mexico, and the Rocky Mountain region. On various occasions the results of his observations and discoveries were reported to the American Association for the Advancement of Science and other organizations.

We may thank Dr. Foote for at least five new mineralogical species: zono-chlorite, mazapilite, paramelaconite, cacoclasite and (of course) footite. He



Albert E. Foote in 1869, at age 23.

“rediscovered” Magnet Cove in Arkansas and obtained beautiful specimens of rutilated quartz, arkansite, wavellite and variscite. He was known for magnificent zircons obtained from Canada, copper minerals from Arizona and New Mexico, hanksite and other minerals from California.

Dr. Foote was so successful in accumulating a very large collection of minerals that he decided to have an exhibit at the Centennial Exposition which was held in Philadelphia in 1876. The exhibit consisted of many excellent and unusual specimens and attracted wide attention. Dr. Foote was given the highest award by the exposition authorities for his exhibit. According to the late Charles R. Toothaker, who worked for Dr. Foote for five years, 1890-1895, Foote's collection was so large that many excellent specimens could not be exhibited in the rather limited space available in the exposition hall. Accordingly he rented a building adjacent to the exposition grounds to show and store large quantities of his material.

Among the visitors to the Foote exhibit were many teachers of chemistry, geology, and mineralogy, and collectors who were greatly impressed with Foote's exhibit. As some desired to purchase specimens, Dr. Foote took them to see the material he had in the building outside the exposition grounds. Much to his surprise, he soon was doing a brisk business selling, buying and trading specimens, which enabled him to support his family. Accordingly, Foote decided to stay in Philadelphia and establish himself as a dealer in minerals and objects of natural history at 1223 Belmont Avenue.

In order to secure a wide distribution of his specimens and collections, Foote began publishing in 1876 “The Naturalists' Leisure Hour and Monthly Bulletin”. This unique monthly was a combination of scientific and general educational articles and personal communications relating to the whole field of natural history. In each issue, considerable space was

naturally devoted to advertising his merchandising activities, which were no longer confined to minerals but extended over the much wider field of natural history and even included medicine.

A selection of a few of the articles contained in a typical issue, such as that of January, 1880, clearly illustrates Foote's endeavor to serve the public educationally and scientifically: "The Stethoscope Song—a Professional Ballad," by Oliver Wendell Holmes; "The Value of First-Hand Information," by D. B. Dalby; "Gluten Flour for Diabetics," by E. J. Hallock; "Physical Education," by Herbert Spencer; a communication dated Ann Arbor, December 2, 1879, to Dr. Foote from Professor Alexander Winchell concerning Winchell leaving his position at Vanderbilt University; and an extended discussion of the mineral quartz and its varieties. The minor articles in this issue also covered a wide range of interesting topics. In the monthly issues of "The Naturalists' Leisure Hour," Foote always called attention to his specimens, collections, and books in the various fields of natural history which he had for sale. In fact, in some issues whole pages advertising these items were in French and German.

Since "The Naturalists' Leisure Hour" had a very large circulation, A. E. Foote became recognized throughout the world as a highly reputable business man. He frequently published lists of some of the scientists with whom he had dealings, as well as the colleges, universities and museums which were his regular customers. These lists were very impressive, for they contained the names of many leading scientists, collectors, educational institutions and museums of the world of the period from 1876 to 1895, when Foote died.

According to Toothaker, Foote was constantly making collecting trips to important mineral localities such as Joplin, Missouri; Pikes Peak, Colorado; Canyon Diablo, Arizona; Organ Mountains, New Mexico; Guanajuato,

Zacatecas, Quaretera, Mexico; as well as to Mount Vesuvius and famous localities in Sicily, Sardinia, Algeria, Greece, Sweden and elsewhere. On his frequent European trips he always managed to visit the British Museum and the leading mineralogists, scientists, and museums on the continent. Foote's business expanded rapidly and he was obliged to move from 1223 Belmont Avenue to obtain larger space, first to 4116 Elm Avenue and later to 1224-26-28 North 41st Street.

Foote was greatly interested in meteorites and was always on the lookout for new finds. Early in 1891 he heard of a "mine of native iron" at Canyon Diablo, Arizona, and in June he made a trip to the locality and found three large masses of meteoric iron—201, 154, and 40 pounds respectively. Aside from the large masses referred to, Foote collected from the locality 131 fragments ranging in weight from one-eighth of an ounce to six pounds ten ounces.

The 40-pound specimen was broken by a trip hammer, and one of the pieces was sent for examination to Professor George A. Koenig, the distinguished chemical mineralogist at the University of Pennsylvania. Dr. Koenig reported that "in cutting the meteoric iron for study, it had been found of an extraordinary hardness, the action taking a day and a half, and a number of chisels having been destroyed in the process." On examination Koenig found small diamonds in the meteoric iron. He could not account for the extraordinary hardness except that it was due to the presence of the diamonds. Further examination revealed that over a dozen specimens contained diamonds.

Toothaker, who worked for Foote at this time, reported that Foote made arrangements with the owner of the locality that specimens he and his associates might find during a period of one year were to be sent to him, and that his competitor, Henry A. Ward, founder of Ward's Natural Science Establishment, Rochester, New York, was not to get any.



Dr. Albert E. Foote and his son Warren at the New Orleans Exposition of 1885. Like several other Foote exhibits of minerals, this comprehensive display also won an award.

An article by Foote describing this find of meteoric iron and the conclusion reached by Professor Koenig that the iron contains diamonds was read before the American Association for the Advancement of Science, August 20, 1891, and later published in the *American Journal of Science*. As a result of this wide publicity, specimens of the Canyon Diablo meteoric iron were sold to all the important museums and collectors throughout the world.

With the rapid development of the United States during the closing decades of the Nineteenth Century, the exploitation of our mineral resources and the advances in technology, Foote began to receive requests to supply large quantities of minerals. For example, in 1893 he received an order for a thousand pounds of rutile for use in chemical research.

As Dr. Foote had contracted tuberculosis, he was obliged to leave Philadelphia some time during the fall months and spend the winter in a warm climate. In 1895 the State of Pennsylvania decided to have an exhibit at the Atlanta, Georgia Exposi-

tion. Foote was appointed a member of the commission to plan the exhibit. He supplied a large part of the exhibit and installed it in the Mining Building. In this undertaking he was assisted by Toothaker. The Exposition opened on September 18, 1895. Later the weather at Atlanta was rough and cold, and Foote stayed too long. He died on November 10, 1895, at the age of 49.

Although Dr. Foote died in middle age, through his great energy and comprehensive knowledge of the sciences he made many significant and enduring contributions. He was most favorably known the world over, and indeed the name Foote is still indelibly linked with the mineral and chemical industries.

His death did not go unnoticed. Professor E. S. Dana wrote: "My relations with the late Dr. Foote extended over some twenty years and I thus had full opportunity to become acquainted with the unflinching activity and tireless enthusiasm which he devoted to his mineralogical work . . . His work was carried on with the same energy even

(Continued on page 78)

STONEHENGE, England's Noted Relic

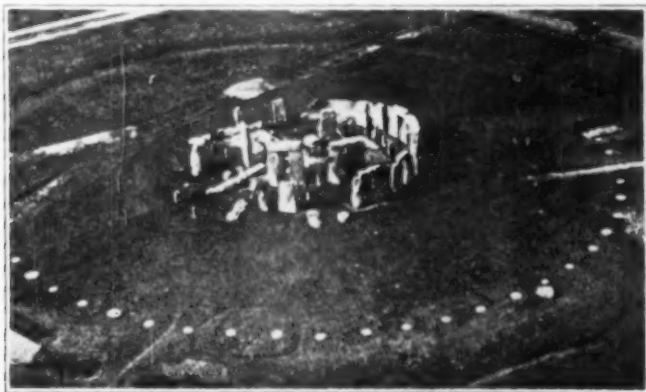
By BURKE SMITH, JR.

A FEW minutes' drive north from the old cathedral town of Salisbury takes you to an even more ancient religious site, the remains of Stonehenge. This ruined temple is at first view a startling sight amid the wheat fields and pleasant rolling pasture land of Southern England. Seen from a distance on a fine summer day, with white clouds lazily over peaceful Salisbury Plain, the dark cluster of stones seems almost unreal. It is hard to imagine the intense industry of the people who set the stones upright here some thirty-four hundred years ago.

Not by accident was Stonehenge built on Salisbury Plain. From the time that Britain became an island, this region offered advantages to settlement. The thin upland soil underlain by chalk sustained the crops and herds of prehistoric man here, but not the swamps and dense forests hostile to him. It can be reached by three rivers: the Thames from the east, and the two Avons, one from the west, the other from the south, which flows within a mile of Stonehenge. Also hills extend in all directions, providing another set of ready-made travel routes. To the west stretch the Mendip Hills and the Downs of Dorset; to the north, the White Horse Hills

and the Cotswolds; to the northeast, the Chiltern Hills, and to the southeast the Downs of Surrey and Sussex. Those who built Stonehenge must have considered it the center of their world, as London is to modern Britain.

If you stop on the road from Amesbury to Warminster today and pay your sixpence to the blue-uniformed guard (for the site is now a national monument) you can enter the enclosure and examine the stones at leisure. At close range, they appear more impressive than at a distance. The original builders planned an outer circle of upright stones; seventeen of the original thirty, set in a ring ninety-seven feet across, still stand. Each upright is over thirteen feet high, seven feet wide and two feet thick. Stones are spaced three feet apart with massive lintels spanning ten feet from center to center at the top. Eight giants, six of them capped with lintels, rise inside the outer circle. These are twenty to twenty-five feet high above ground, which is here scattered with fallen stones, making a good place for visiting children to play hide-and-seek. As you walk around you will notice a number of slender uprights about eight feet high interspersed among the others, and you may



THE GREAT STONE CIRCLE at STONEHENGE

also notice that there are several large stones outside the enclosure. The whole accumulation sits in the middle of a flat grassy prominence which commands a fine view of the surrounding plain.

You might wonder, as the weight of these ancient, lichen-covered stones becomes apparent to you, how men with only primitive tools could have brought them here, erected them, and placed the heavy lintels on top. In imagination you might also picture a procession of Druids arriving to prepare a sacrifice as smoke from a sacred fire rose upward, and the victim, perhaps human, was readied for slaughter at sunrise. Thousands of tourists have imagined likewise over the centuries. The site was described by Samuel Pepys in his diary after a visit here. The antiquarian, Aubrey, whose plan of Stonehenge made in 1666 is now in the Bodleian Library at Oxford, was the first to describe a circle of holes which ring the outer edges of the site. These holes are still known as "Aubrey holes" in his honor. William Stukley made a good field survey in 1723, but his later ideas associating Stonehenge with Druid rites are considered questionable today, to say the least. In 1771 Dr. John Smith observed that the sun rises on the longest day of the year directly in line with a certain stone outside the circle, known as the Heelstone. This observation stirred up a great deal of interest which has continued to the present day on the alignment of Stonehenge, and suggests that the sun played an important part in the festivals or rituals that went on there.

Before archaeology became a science, the unique value of Stonehenge was not generally realized. During the Middle Ages the Church encouraged people to destroy pagan remains and over the centuries farmers and artisans carted off stones from the site to build local bridges, streets and buildings. Fortunately the size of the larger stones saved them from destruction, although several of them toppled as a result of digging by treasure seekers.

In 1922 the British Government took over the site, and scientific digging and restoration have been carried on periodically since that date. We now have many facts with which to test theories about this astonishing structure. For instance, we know where most of the stones came from to build the monument. Airplane photographs taken in 1923 show definite traces of an avenue, first mentioned by Stukely in 1723, which leads up to Stonehenge from the Avon River at West Amesbury. The Salisbury Museum contains many objects, including pottery, which tell us by inference what kind of men built and used the monument from the time of the Stone Age onward. We know that the Druids had nothing to do with the building of Stonehenge, and if they used the site at all, were not important in its history. In spite of the available evidence, which has told us much, the fundamental enigma of just how and why prehistoric men used the monument, will probably always remain to tantalize our curiosity.

Stonehenge was intentionally built to face northeast, as were most other prehistoric stone circles in southwest England and Wales. The Avenue previously mentioned runs straight in that direction for some five hundred yards from the stone circle before it curves; it then continues in traces for about a mile and a half almost to the river. As you stand looking northeast among the stones you can picture this Avenue as it might have looked to a group of warrior-priests about 1000 B.C., as they marched up it on a festival day, after disembarking from a trip up the river. The processional way was roughly the width of a four-lane highway—forty-seven feet wide. Banks eight feet high were built from the excavation of an outer ditch on either side, and may have had rows of posts along the way, although no trace of the posts survives today.

Before reaching the outermost stone circle, the procession may have paused at the large pointed Heelstone before continuing some seventy-five feet to cross the circular ditch and embank-

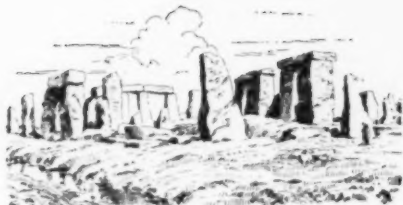


PLAN OF STONEHENGE

At the left, as the stones originally stood; at right, as they now lie.

ment surrounding the monument site. Erosion has reduced the height of the bank to a swell of earth, now easily overlooked, but it must originally have been as high as the banks on the Avenue and may have served as a grandstand, three hundred feet in diameter, from which an audience could observe ceremonies taking place inside the circle of stones. It is a peculiarity of Stonehenge that the circular bank is inside the surrounding ditch which supplied the earth for its erection. At nearby Avebury and simpler stone circles in Britain, earthworks were thrown up outside the ditch. Whether this was done for defense, or to separate an audience from the inner sanctuary, we do not know for certain. Perhaps the ceremonies at Stonehenge were of such a nature that at certain times the watching crowds could leave their perch on the banks and join in the ritual.

Just inside the embankment, you will find a series of white markers which indicate the "Aubrey Holes." These holes, three feet deep and five feet in diameter, were dug out of solid chalk and occur every sixteen feet, making a large circle two hundred and eighty-eight feet across. The center of this circle does not quite coincide with the center of the outer stone circle, being two and one-half feet south of where it ought to be. Since we think the builders of Stonehenge were quite capable of locating the two circles from a precise center, this raises the question as to whether the Aubrey holes were put in at the time the stones were erected, or at an earlier date. There are some other unusual things about these holes.

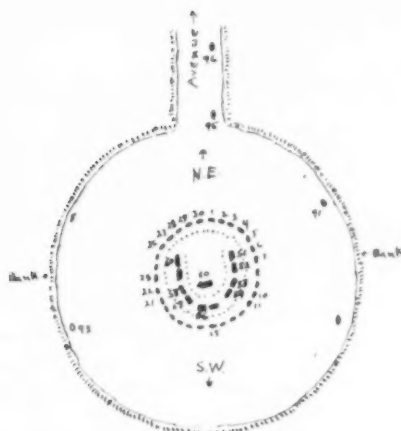


STONEHENGE TO-DAY

Stones strewn about by the ravages of the elements.

When the archaeologists, Hawley and Newall, rediscovered the fifty-six locations from marks shown on Aubrey's map, they found that most of the holes contained parts of cremated human skeletons. Yet some of these holes had the chalk around the rim broken, as though there had been upright stones or wooden pillars inserted and later pulled out. One theory to explain the complex history of the Aubrey holes is that the holes were made for a stone circle built much earlier than the Stonehenge one. If so, it was for some reason torn down, perhaps to make room for the later Stonehenge, and the cremated remains were added much later.

We can picture only with unaided imagination the rituals that took place two thousand years ago inside the stone circle where you now stand, but we are much more certain as to how Stonehenge was constructed. Basically the design of the place comprises two outer circles of stones surrounding two sets of stones arranged in a horseshoe plan, one inside the other. The open ends of the horseshoes face northeast toward the Avenue; in the opposite direction, near the toes of the inner horseshoe, is a large flat slab which could have served as an altar. If you stand facing northeast at this stone on June twenty-first of any year, the sun will rise over the Heelstone, just as it did for Dr. John Smith in 1771, as well as for the builders of Stonehenge in prehistoric times. This seems to indicate that the sun played some part in the building and use of Stonehenge; but whether the sun itself was the object of worship, or whether it served to set the date for festivals or rituals,



SITE OF THE STONEHENGE

Large standing stones are numbered. 1-30 Sarsen Circle; 51-60 Trilithons; 80 Altar Stone; 96 Heel Stone.

is still a matter of opinion.

The outer circle of stones we have described at the beginning of this article. These stones with their spanning lintels are known as Sarsen stones, a term whose meaning is obscure. The inner stone circle originally contained about fifty small uprights, only twenty-one of which are left, as they were easier to cart away than the Sarsen stones. The giant stones which make up the outer horseshoe are the climax of the whole monument. There were originally five pairs, each capped with a separate lintel. Each pair with its lintel is known as a "trilithon" or separate unit of three stones. The tallest trilithon, of which only a single upright is left, is directly behind the altar stone at the toe of the horseshoe, and the others are on each side of it in descending heights. The tallest stone measures thirty feet from top to bottom, of which eight feet is underground. The trilithon uprights were set with only about a foot between them on their inner sides, with a distance between pairs of ten feet. Three complete trilithons stand today, including one which was reset in 1958. By comparison the innermost horseshoe is insignificant in size. Only eight small stones remain of the original nineteen, standing six to eight feet high.

The weathered gray-brown stones, tinged green with lichens, look deceptively alike, but they are actually of several origins. Those forming the outer Sarsen circle, and the large trilithons, are native Wiltshire sandstone, formed in Tertiary geologic time. This stone varies greatly in strength, ranging from a granite-like hardness to the crumbling softness of sugar. Outcroppings exist in northern Wiltshire, where the stone is now used in roadbuilding. Probably no large stones were found at Stonehenge, but within a radius of twenty miles, especially around Marlborough to the north, there could have been solid chunks of Sarsen lying exposed for prehistoric stonemasons to work on. There are no chisel marks on the stones; apparently they were pounded into shape directly with hammerstones the size of a baseball or larger. Perhaps fire and water were used to crack them into rough chunks to start with. Men alone must have pulled the huge stones to the building site. Very likely the dressed stones were set on log rollers or on a V-shaped sledge made from the fork of a tree, and pulled with the aid of thong ropes mile by mile, as stones were moved to build the Pyramids.

(Continued on Page 76)

Notes of New Pliohippus Find

by ROBERT STEELE

IN the northern section of the Tehachapi Mountain Range, near Bed Rock Canyon there is an outcropping of rock strata of Thaison age, said to be not less than ten million years old, in which I have recently found many excellent mammalian fossils which are deserving of closer field exploration and study.

As the picture will show, these teeth are in the most excellent state of preservation, many being still rooted in the jaw bone, and their enamel almost as perfect as when it existed in the living animal, which is said to be quite unusual. I have at least one complete set intact.

The teeth were examined by the resident paleontologist of the famous "La Brea" beds of the "Great Tar Pits," in Los Angeles, who identified them as belonging to the species Pliohippus, an early ancestor of the present day family of horses, which were much smaller in stature than the smallest Shetland Pony of today, and one of several monodactyl (one toed)

species. At least two species of Pliohippus are recognized, the well known *P. lullianus*, Troxel, and *P. pernix*, the fossil remains of both of which are found in the valley of the Little White River near the town of Mission in the eastern part of the Rosebud Indian Reservation of South Dakota.

So well preserved are these fossils found in the Bed Rock Canyon Area, that some of the food yet remains between the teeth, in a fossilized state, and in such a condition that it might possibly be analyzed by the paleontologist if one should care to attempt it.

It is hoped that this district will be carefully worked more fully by those who are competent to do so, and if this should come about I would be glad to aid or direct them if contacted at my residence at 1381 Glenfinnon, in Covina, California.

N.B. For a detailed description concerning the evolution of EQUIDAE (Horse family), consult Bulletin No. 13, Department of Geology, South Dakota School of Mines (Rapid City, S.D.), by C. C. O'Harra.



Illustrating typical specimens of Pliohippus fossil teeth found by our author near Bed Rock Canyon, California.

Ward's New Geology Catalogue

(No. 603—August, 1960)

Offers You the Choice of the BEST

Mineral, rock and fossil collections—Mineral, rock and fossil specimens—Aids for crystallographic study—Models: geomorphological, crystal form, structure—Color slides for geology—Superb photographs of minerals—Black and white slides for astronomy—Superb selection of the finest storage and display equipment—Lapidary equipment—Fluorescence and radiation equipment—Field and laboratory supplies.

WARD'S NEW GEOLOGY CATALOG IS THE ANSWER TO YOUR NEEDS

Price \$1.00

Ward's Mineral Specimen Catalog, FM 13, lists individual mineral specimens, popular collections Free on request

WARD'S NATURAL SCIENCE ESTABLISHMENT, INC.

P.O. Box 1712

ROCHESTER 3, N.Y.

Notes On The Minerals Of Franklin and Sterling Hill, N. J.

A non-technical quarterly on the geology, mineralogy and history of the famous New Jersey zinc deposit. With Prof. Palache's classical book now available, this quarterly is being acclaimed as a supplement to the famous book by Charles Palache.

Subscription \$2.00 a year

John S. Albanese
P. O. Box 221, Union, N. J.

GEM BOOKS

If it is rare, old or out-of-print
I may have it.

Idar-Oberstein—2000 years old	\$15.00
Langford—Fern Fossils	20.00
Wright—Native Silica	6.00
Schlegel—Gemstones of the U.S.	1.00
Bauer—Edelsteinkunde	49.00
Ball—A Roman Book on Gems	7.50
Church—Precious Stones	5.00
Davenport—Cameos	10.00
Idriess—Forty Fathoms Deep	7.50
Dakin—Pearls	4.50

Watch for another listing in next issue. Send 25c for catalogue (Credit on first \$5.00 order)

Lock Box
1515-C

Willems

Chicago
90

ALASKAN GOLD ORE

High grade Gold Ore specimens and gem roughs
Pieces approximately 1" x 3/16"
Priced in proportion to visible gold contents
\$2.00 to \$25.00 each

Specified or random pieces in same proportion

ALASKAN JADE

Black and green, gem quality
3/16" slabs, \$2.00 per sq. in.
Specified shapes and sizes proportionately
Postage paid on orders over \$10.00

P. J. McDONALD

1104—2nd Ave., Apt. 2
Fairbanks, Alaska

CALLING ALL ROCKHOUNDS

Don't buy a pig in a poke.
Come, see what you buy.

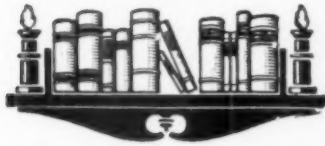
Machinery, supplies, rocks, findings and mountings.
We have invested thousands for your convenience.

Open every day except Tuesday.
Sunday at 1 P.M.—No lists.

THE RILEY ROCK SHOP

R. D. 2, DIALTON RD.
SPRINGFIELD, OHIO
2 miles north of North Hampton
Phone WO 4-1460

Book Reviews



HARKER'S PETROLOGY FOR STUDENTS. Alfred Harker. 8th edition. Revised by C. E. Tilley, S. R. Nockolds, and M. Black. New York: Cambridge University Press. 1960. 283 pp. Paperbound \$1.95.

The sub-title of this book is "An Introduction to the Study of Rocks under the Microscope." The first edition appeared in 1895. Succeeding editions have kept pace with developments in microscopy. The object of investigation, the author believes, should be not merely the composition of a rock but also its history. To this end the student should note texture, order of crystallization, intergrowths, interpositions, pseudomorphs, vesicles, etc.

Even the best microscopic examination and interpretation will probably never result in exact classification of rocks such as exists for chemical elements and physical forces because rocks of different types are often connected by insensible gradations. Perhaps because exact classification is wanting, the nomenclature of rocks is confusing. Many names originated prior to modern methods of investigation. Moreover, various writers in the field of petrology have arbitrarily changed the application of these older names and introduced new ones. The author rejects the principle followed by many continental writers of assigning one name to pre-Tertiary groups and another to Tertiary groups of the same characteristics.

Classification of igneous rocks depends not only on differences in mineral composition of the magmas from which the rocks were formed, but also on conditions attending their consolidation. For purposes of discussion the author begins with the igneous rocks which he divides into abyssal or plutonic, hypabyssal, and superficial or volcanic. Under these headings the families are arranged roughly in order from the more acid to the more basic. Thus under plutonic the arrangement is granites, syenites, diorites, gabbros, and peridotites; under hypabyssal it is quartz, porphyries, dolerites, and

lamprophyres; under volcanic it is rhyolites, trachytes, andesites, basalt. Sedimentary rocks are arranged under arenaceous (coarse detrital), argillaceous (finer detrital), calcareous, and fragmental volcanic. Metamorphic rocks are arranged under thermal metamorphism and dynamic metamorphism.

In an introductory chapter the author describes the type of microscope best suited for the study of rocks, i.e., one fitted with polarizing and analyzing prisms, and a rotating stage with graduated circle and index. Rocks analyzed are chiefly from locations in the British Isles but Canadian and U.S. sources are also widely cited. This book tells a great deal about rocks and does so with a minimum of verbiage. One of the most interesting sections, to this reviewer, is that on the nature of the cementing process in quartzite and the minerals of sand. Black and white drawings, with magnifications noted, illustrate the text.

THE TRUTH ABOUT ADAMS DIGGINGS. New Mexico's Own Lost Mine Story. Glen A. Burch, 10304 Propps Drive, N.E., Albuquerque, New Mexico. 19 pp. Paperbound \$1.00.

If you knew a winning combination of plays, would you sit out the evenings in your hotel room in Monte Carlo?

That's what Glen A. Burch is doing. He has found the famous Adams Diggings and the gold under the gravel of the bar beside the stream in the Z-shaped canyon. Of the hundreds who sought, he alone found. Did he bring the gold out of the canyon through the secret door? No, not yet. He is tasting the sweetness of his triumph. He wanted to tell the world about it so he wrote this little book, not to divulge the route to the Diggings but to tell about Adams and his party, the trail marked by Twin Peaks and the Beautiful Woman, the ambush by Indians, the bodies piled between boulders. Also, he wanted to tell old prospectors who, like himself, had searched for the Diggings, that they had not followed a

(Continued on page 81)

(Continued from page 72)

The finished stones show evidence of refined craftsmanship. The uprights taper slightly at the top and are rounded at the bottom; this would make them easier to maneuver into place in the holes dug for them. Rounded knobs, or tenons, project at the top of each upright, and the capping stones have corresponding mortise holes into which the tenons fit snugly. Perhaps this construction was modeled after earlier wooden designs. The lintel stones which cap the uprights are curved to make a well-rounded circle. They also jut forward slightly at the top, to compensate for the foreshortening effect when seen from the ground. How these lintels were raised and placed is not clear. There is no evidence of a dirt ramp, which leaves us an alternative theory that they were placed on wooden cribs and raised level by level with the aid of a fulcrum and blocks. Today the stones are rough and pitted from centuries of exposure above ground, but when soil is removed from around the base of the uprights, the smooth, even texture of the original dressing can be seen.

The smaller stones of the inner circle and the inner horseshoe, with one exception, are not sandstone at all, but are technically classed as crystalline igneous dolerites or volcanic rhyolites. Because of their blue-green color when cut, they are commonly called bluestones. They are also known as Prescelly stones from a district in Welsh Pembrokeshire where they abound. There are numerous stone circles of a simple type around Prescelly, and some of the uprights used at Stonehenge are believed to have been taken from them. Such stones must have been highly prized to have been brought from such a distance, which is two hundred miles by sea. The large altar stone which lies within the inner horseshoe is of Welsh micaceous sandstone.

Stonehenge, like Rome, was not built in a day. Indications of building activity cover a period of at least five hundred years. Probably the first

structures were the circular ditch and bank, built at the close of the New Stone Age, about 2000 B.C. The Heel Stone may have served as a marker at the entrance at this early time. Also the Aubrey holes were probably dug inside the bank at this time, for use possibly as cremation pits or entrance holes to communicate with gods of the underworld.

By the year 1700 B.C., invaders from the Low Countries displaced the New Stone Age people who first created Stonehenge. These invaders, called the Beaker Folk from a particular type of earthen jar or beaker made by their women, were probably the ones who brought the bluestones from Prescelly and set them up anew in two circles. They also may have made the Avenue or processional way. Since the Beaker Folk had trade connections with Ireland, they must have known of the Prescelly bluestone circles. They were skilled seafarers and could have moved the heavy stones by sea, hanging them lengthwise in the water, suspended between two boats.

The history of this energetic people makes a fascinating story. Round-headed in skull form, Mediterranean in origin (probably from Spain), they spread through Central Europe and in the middle Rhine valley mingled with a Nordic people, known as the Battle-Axe people, before invading eastern and central England. Perhaps it was only coincidence that during this second stage at Stonehenge its layout was oriented in the direction of the rising sun. But it may also have been that the invaders brought with them a Mediterranean sun worship to displace the earth worship of their predecessors.

The third and crowning stage of Stonehenge came two hundred years later, around 1500 B.C. By this time the original Beaker folk had had time to consolidate their culture, which centered in the Salisbury Plain region. A group of strong rulers, known as Wessex Warrior Chiefs, controlled the whole area and a highly developed trading civilization flourished. Baltic amber, blue beads from Egypt, gold

and bronze from Ireland all found their way here as items of luxury and trade. Weapons and artifacts of the time show influences in some cases of the Mycenaean civilization of Greece, which was then the most advanced in the Mediterranean world.

It was under these auspices that the huge Sarsen stones were made and set up to complete the monument at Stonehenge. At the same time, the blue-stone circles were rearranged to form the circle and horseshoe, and the altar stone, Heel Stone and center of the inner horseshoe were arranged to be in line with the rising sun at Midsummer morning. Only a civilization of considerable size and population with powerful chiefs to command the men and supply the food, could have made possible this last impressive architectural feat. There must also have been a strong religious zeal to inspire the building of such a structure.

Who the guiding architect was for the final Stonehenge, we shall probably never know. An interesting speculation has been made that he was a wanderer from Mycenae, chief city of Greece. It is true that the large trilithon at Stonehenge resembles the postern gate of that city; and recently faint traces of daggers of a type current in the eastern Mediterranean region have been found to be etched on some of the Sarsen uprights. Perhaps in addition to importing artifacts from Greece, the land of the Wessex Warrior Chiefs may also have imported an architect familiar with the temples of Mycenae. No ordinary explanation for the plan of Stonehenge is quite convincing, as it is the most refined and unique structure built by prehistoric man in Western Europe.

"Smoke that thunders"

The roar of Victoria Falls on Africa's Zambezi River can be heard 20 miles. The great plume of water vapor is visible for seven miles. Like Niagara Falls, Victoria Falls stretches 1,900 yards across and has a maximum drop of 355 feet. (See our Feb. '61 issue, pg. 16.)

NEW NEW NEW SO YOU WANT TO START A ROCK SHOP

by the Victors

Vital and essential information about starting and operating a small hobby type business.

GEM TUMBLING & Baroque Jewelry Making

by the Victors

A complete and authoritative book of detailed tumbling instructions
Now in 7th edition

Just the answer
for that Different Gift.

Ask for these at your dealer

or order from

VICTOR AGATE SHOP

So. 1709 Cedar

SPOKANE 41

WASHINGTON

\$2.00 Each, Postpaid
Washington residents add 8c tax

QUALITY RUBBER STAMPS

If you are in Business or are a Hobbyist you need RUBBER STAMPS. We will be pleased to send our Price List and new Specimen Chart to you at your request.



STRUNG JEWELRY TAGS
JEWELRY DUMBBELL TAGS—GUMMED
PRES-A-PLY LABELS

Adhere to gems, rocks, plastics, metal, glass and many other surfaces.

Write for free literature today

OFFICE SPECIALTIES (ES)
2364 No. 58th St., SEATTLE 3, WASH.

CANADIAN FIELD TRIPS

conducted for
Clubs and individuals
For information, write

YORK RIVER MINING CO.

9618 Parkman Rd.

Windham, Ohio

(Continued from page 68)

when his health was seriously impaired. The results of his labor are to be found in the development of American mineral localities and in the distribution of specimens not only throughout this country, but to many parts of the world, by which the knowledge of mineralogy and the general interest in its study have been much increased."

Another prominent scientist, Professor Thomas Eggleston, wrote: "He was certainly the most enterprising mineral collector and merchant that we have had in this country. No one ever did so much to disseminate a knowledge of American minerals in Europe as he."

And a friend and contemporary of Foote, George F. Kunz, had this to say: "In the twenty-eight or thirty years of his collecting, he has placed in the cabinets of the world several millions of specimens, besides many thousands of small cabinets in which the specimens were sold as low as one hundred for a dollar. The impulse given and the facilities afforded both to beginners and to advanced collectors by this vast amount of distribution are beyond calculation in their influence on the development of this branch of study."

*Based upon "Albert E. Foote, The Naturalist—A Michigan Alumnus," *Michigan Alumnus Quarterly Review*, Vol. LXIV, No. 21, 1958, pp. 342 and 347, with additions by John W. Donahey.

**George F. Kunz, *Memoirs of Albert E. Foote*, Bull. Geol. Soc. Am., Vol. 7, 1895.

AGATE HUNTING IN NORTHEASTERN KANSAS

By WILLIAM BOLTZ

Many people not familiar with the geological history of northeastern Kansas are surprised to learn that there are gem quality minerals to be found near Topeka, in Shawnee County, as well as Jackson, Jefferson, Douglas and Wabaunsee Counties.

The gem minerals consist of agates, jaspers, petrified wood, feldspars and other unidentified hard rocks which will take a fine polish—all of which are

foreign to this region and were deposited by the glaciers during the Ice Age.

The glacial ice sheet penetrated the area as far south as the southeastern corner of Shawnee County, near Richland, and left a series of terminal moraines extending northwestward towards Berryton, from there to the eastern boundary of Forbes Air Force Base, then north to Terra Heights on Highway 75 at about 49th Street. From this point an extensive moraine is easily traced to the vicinity of 29th Street and Gage. From there less prominent deposits appear in a southwestwardly line along Highway 4 to the vicinity of Dover, after which they turn northwestward towards Maple Hill and from there the moraines apparently cross the Kansas River near Wamego.

These moraines have produced some beautiful Lake Superior type agates in red and white banded colors. Gravel pits and other heavy construction dirt moving jobs have uncovered and exposed deeply buried gravel deposits which carry this distinctive type agate. These deeply buried beds are protected from the weather and the freezing and thawing action of winter, consequently they are less fractured than those in the more exposed areas.

Although most of the agates recovered are rather small—generally from pigeon to hen-egg size, however quite recently several have been found of a pound or more in size—some larger specimens of four pounds or more turn up now and then, but the larger ones are usually of inferior quality.

North of the Kansas River in Shawnee, Jackson and Jefferson Counties, the glacial deposits are more thinly spread, but there are numerous fields where heavy erosion has occurred or contouring and terracing have exposed much of the glacial till. These spots make excellent hunting grounds for agates, jasper and petrified wood, much of which is well suited to cutting and polishing.

Courtesy The Glacial Drifter.

(Continued from page 57)

GEOLOGICAL SOCIETY OF MINNESOTA is enjoying a weekly series of lectures on the "Geology of Minnesota," by Dr. Sloan of the University of Minnesota. All science teachers in the Twin Cities area have been invited to attend the lectures and many are coming to the weekly meetings.

A member of GSOM, George Rickert, has donated more than 90 sets of Mississippi Valley mineral and fossil specimens to schools in the St. Paul area. Each set contains 55 labeled specimens.

SAC AND FOX LAPIDARY CLUB will hold two gem shows during April. The first show will be held in the YMCA at Ottumwa, Iowa on April 15 and 16. The second show will be at Oskaloosa, Iowa in the Farm Bureau Building on April 21, 22, and 23. The society has 31 members and each member plans to display one or more cases of gems and jewelry at each show.

NEBRASKA MINERAL AND GEM CLUB on January 18 featured a program on "Pearls." John Hufford gave an interesting talk on "Fresh Water Pearls," including information on how the shells of pearl-bearing clams can be used for making small ornamental objects and where they may be found in local waters. Mrs. Kenneth McDowell displayed a large collection of cultured pearls from the Ko Kichi Miki Moto Pearl Co. of Japan. Also on display were small art objects and jewelry made from mother of pearl.

MIAMI VALLEY MINERAL AND GEM CLUB'S Let's Explore Ohio contest has unearthed some beautiful nodules of agate, quartz geodes, and jasper, but nothing in quantity. The contest was launched six months ago to spur interest in searching for new gem-cutting materials in Ohio. A display of polished objects made from newly discovered material will be featured when the contest closes at the end of the year.

WABASH VALLEY GEM AND MINERAL SOCIETY recently heard Jay Farr speak on "Gems of the Bible." His talk, which was beautifully illustrated with colored slides, included the history and a vivid description of Aaron's Breast Plate.

ST. LOUIS MINERAL AND GEM SOCIETY on Jan. 14-15 visited Keokuk, Iowa and Hamilton, Illinois to collect geodes. The geodes were plentiful, but a little digging was required to get them out of the ground. Minerals found in the geodes included calcite, dolomite, quartz, sphalerite, chalcedony, kaolin and capil-

lary marcasite. Oil bearing geodes were found in a creek north of Keokuk.

INDIANA GEOLOGY AND GEM SOCIETY learned the difference between caves and caverns and stalagmites and stalactites on Feb. 3 when speleologist Art Davis gave the group an illustrated talk on "Caves". On Feb. 19 Mr. Davis took the group on a spelunking trip to explore the Salamander Cave near Bloomington, Indiana. This cave was recently opened and it contains beautiful rare helectites (stalactites that never heard of the law of gravity.)

MEMPHIS ARCHEOLOGICAL AND GEOLOGICAL SOCIETY was given a demonstration and talk on "Stone Carving" at its January meeting by Mrs. Edna Holbrook, an artist who works in this medium.

The society now owns a crystal claim near Mt. Ida, Arkansas. It contains excellent quartz crystals but hard work is required to dig them out.

EVANSVILLE LAPIDARY SOCIETY'S members' exhibits at Evansville's first Mid-states Craft Exhibition were the star attractions of the show which was held Jan. 15 through Feb. 15 at the Evansville Public Museum.

MUSKEGON COUNTY ROCK AND MINERAL ASSOCIATION on Jan. 23 heard Howard Cooper give a fascinating talk on "Gem Stones of the Bible." Mr. Cooper also presented a special exhibit of organic gems.

DES MOINES LAPIDARY SOCIETY assisted the Y.M.C.A. in setting up a lapidary shop and is now supplying it with lapidary instructors and gem cutting materials.

GRAND RAPIDS MINERAL SOCIETY on Feb. 8 enjoyed a lecture on "Molecules and Minerals," by Dr. Harold Stonehouse, Professor of Geology at Michigan State University.

The society will hold its second annual show at the Grand Rapids Museum on April 16-30.

CENTRAL IOWA MINERAL SOCIETY on March 7-18 held its annual exhibit of rocks and minerals in the Foyer of Youngkers in Des Moines. This exhibit marked the first use by any society of the new Midwest Federation cases. The handsome new cases were greatly admired by both members and visitors.

FLINT ROCK AND GEM CLUB is considering a visit to the Royal Ontario Museum at Toronto, Canada. This museum is the "Smithsonian" of Canada, and, for size and grandeur, is supposed to be fabulous. The club is also planning

(Continued on page 87)

SHOPPING for PRICE?

Immediate Delivery—Prepaid

NEW LOW PRICES from our 1961 FREE CATALOG

18K Gold or Rhodium Electroplate		Each	Six	Dozen
140	Filigree Pendant for 18x25mm oval	\$.25	\$1.00	\$1.95
140A	Matching Brooch with safety clasp	.30	1.60	2.85
141	Plain Pendant for 18x25mm oval	.30	1.25	2.25
141A	Matching Brooch with safety clasp	.35	1.75	3.15
108BB	Bracelet Large Curb Chain	.20		1.35
108BN	Necklace 24" Small Curb Chain	Same as 108BB		
97B	Bracelet Heart Cement on Pad	.35	1.95	3.50
126	Key Chain with Snake Chain		.75	1.25
59	Cuff Links with 13mm Cement on Pad		1.05 (6 pair)	1.90 (12 pair)
12	Earring Fancy Button with split drop		1.00 (6 pair)	1.80 (12 pair)
93	Chain Medium Rope		\$2.00 for 10 feet	
94	Chain Bar-Link		2.00 for 10 feet	

PEARLS Drilled, Undrilled, Strands.

Baroques—Preforms—Charms—Bolo Supplies.

NEW LOOK LINE for Tiny Stone Cement in Clusters.

Add 10% Federal Tax. California Residents also add 4% Sales Tax.

25¢ Handling Charge orders less than \$3.00. DEALERS WRITE.

JEWELGEMS by JAY O'DAY

P.O. Box 1000E

1000 Palms, California

FOSSIL MARINE LIFE

Millions of years old

Corals, Crinoids, Brachiopods, Etc.

Each Mounted on a 2"x3"

Decorative Mahogany Base

INTERESTING EDUCATIONAL

\$1.00 Postpaid

HOUSE OF ENTERPRISE

P.O. Box 88, Garden City, L.I., N.Y.

The Complete Mineral Shop

Inquiries Welcome

Drop in and see us when in town

GLOBE MINERALS

163-03 Depot Road Flushing 58, New York
Opposite B'Way Station of the L.I.R.R., near 162nd
Street & Northern Blvd.

FLUORITE MINERALS

Southern Illinois and Kentucky

When in this part of the country be sure to stop
and visit us and make your own selection of beau-
tiful Fluorite Crystals. Price list, 10c.

B. E. CLEMENT MINERALS

Road U.S. 60 N. Marion, Ky.

Attention Lapidarists! !

KONA DOLOMITE, the newly found gem stone for

SPHERES—Interesting foliation and variegated colors produce spheres of unusual patterns.

BOOKENDS—Available in large chunks with a variety of color and scenes.

CABINET SPECIMENS—Beautiful scenic slabs (predominantly mountain scenes) will enhance any mineral collection.

JEWELRY—Varied design including human and animated figures lends itself to its use in necklaces, bolo ties, pendants, cuff links, etc.

DROP INTO YOUR FAVORITE ROCK SHOP AND ASK FOR KONA DOLOMITE

MARKERT & STEELE

107 West Ridge Street,
Ishpeming, Michigan

(Continued from page 75)

will-of-the-wisp. There are photographs in the book, taken along the trail. If you can match their counterpart in reality, you are on your way to the Diggings.

"Long ago," Mr. Burch writes, "I knew that if I found this lost place I would not dig up any gold for one year." This is his tribute to the searchers who failed, and to their women who did without and who did the work while their men tramped the endless miles from the Kaibab Forest to the San Pedro Valley.

THE MEDITERRANEAN LANDS. D. S. Walker. John Wiley & Sons, Inc. 1961. 524 pp. \$6.75.

We hesitate to refer to this book as a travel guide in view of the many superficial tracts which have appeared under that name. But what a preparation Mr. Walker's study would be for a visit to the Mediterranean and its encircling lands!

The author first tells us something of the Mediterranean itself, which once extended much farther eastward and southward. Since Tertiary times it has occupied a major downfold between the continents of Europe and Africa. Its submarine relief is marked by many ridges, and a continental shelf extends outward from the Tunisian Coast. The Sea is marked by extremely high evaporation — 115,400 cubic metres per second. About 70% of this loss is compensated for by the excess of inflow from the Atlantic over outflow.

Mr. Walker is an Englishman and has made many journeys to the lands he describes. His book is divided into 5 parts: General, including Climate, Soil, Vegetation; The Western Basin — Europe (Spain, Portugal, France, Italy); The Western Basin — Africa (Morocco, Algeria, Tunis); Balkan Peninsula (Yugoslavia, Albania, Greece); The Near East (Turkey, Cyprus, Israel, Egypt). Each land area is studied in depth, with soil and climate related to geological history. Special characteristics, such as volcanic activity in Italy, are described in detail. The author deplores the deforestation and consequent erosion which have contributed to the lack of humus in Mediterranean soils. No other part of the world is so rich in Western history and Mr. Walker has portrayed much of it on a stage where natural forces have often played decisive roles.

A statistical appendix of vital and

economic data is part of the book. A valuable glossary of foreign geological terms is also appended.

ANTARCTIC METEOROLOGY. Proceedings of the Symposium held in Melbourne, Australia in February, 1959. Pergamon Press. 1960. 483 pp. \$9.00.

This book is a valuable compilation of observations on Antarctic meteorology undertaken as a program of the International Geophysical Year. Lack of systematic observations in this area prior to IGY had constituted a gap in the global meteorological network. Specifically, the IGY program comprised an investigation of the general circulation in the Antarctic and an investigation of the influence of the Antarctic on the circulation of the Southern Hemisphere and the planetary circulation as a whole.

Participants at the Symposium were scientists from Australia, the United Kingdom, the United States, New Zealand, France, U.S.S.R., Japan, Belgium, Argentina, Union of South Africa, and the World Meteorological Organization. There was general agreement that the density of the network of reporting stations is fairly adequate on the Antarctic land mass but is highly inadequate over the surrounding ocean areas.

The papers presented were in 7 groupings: Local Effects in the Antarctic, Synoptic Analyses and Forecasting, Synoptic Influences in Lower Latitudes, Circulation Studies, Snow and Ice Characteristics, Heat and Mass Exchanges, and Climatological Aspects. A summary of the Proceedings precedes the papers. An interesting feature is a report of the discussion among the participants following each session.

ALLUVIAL PROSPECTING AND MINING. Second (revised) edition. S. V. Griffith. Pergamon Press. 1960. 245 pp. \$7.50.

Alluvial deposits, or placers, refer to earth, sand, gravel, stone, and other transported matter which has been washed away and then deposited by rivers, floods, and other causes upon lands not permanently submerged beneath the waters of lakes or seas.

As indicated by the title, this book deals with the prospecting and mining of such deposits. It is written in simple language and in some detail. Mining engineers, faced with the problems of alluvial mining, will find it helpful.

(Continued on page 85)

Bibliography of the Geology and the Geography of the Chicago Area (1867-1960)

by Tomasz J. Turley

- | | | |
|------|-------------------------------------|---|
| 1867 | Shufeldt, George | History of the Chicago Artesian Wells. |
| 1871 | Hunt, S. | On the oilbearing limestone of Chicago. <i>Am. Jour. Science</i> |
| 1882 | Bannister, N. M. | Economical Geology of Illinois, V. 2, Springfield, Illinois. |
| 1882 | Worthen, A., Andrews, E. | Economical Geology of Illinois, V. 1, Springfield, Illinois. |
| 1885 | Dawson, G. M. | Boulder clays. On the microscopic structure of certain boulder clays and the organisms contained in them. |
| 1886 | Stone, Leander | The Artesian Wells of Chicago. <i>Chicago Acad. of Sciences.</i> |
| 1889 | Hobbs, Wm. H. | Diamond Field of the Great Lakes. <i>Journal of Geology</i> , V. 7, No. 4. |
| 1890 | Worthen, A. | Drift deposits of Illinois, Ill. Geol. Survey. |
| 1890 | Bastin, F. B. | Geology of Chicago, <i>Harpers Mag.</i> 81. |
| 1891 | Spencer, I. W. | Origin of basins of Great Lakes of America. <i>Am. Geologist.</i> |
| 1890 | Guthrie, Ossan | The Lake Michigan Glacier and Glacial Channels Across Chicago. |
| 1893 | Willard, D. E. | Some Geological features of Jackson Park, Chicago. <i>Science.</i> |
| 1896 | Guthrie, Ossan | Relics turned up in drainage canal. <i>Journal of the Western Society of Engineers.</i> |
| 1897 | Laverett, Fr. | Pleistocene Features and Deposits of the Chicago Area. <i>Chicago Acad. Sci. Bull.</i> 51. |
| 1901 | Farrington, O. C. | The Mastodon in Chicago. <i>Chicago Sunday Times</i> , Jan. 6. |
| 1901 | Crook, A. R. | Minerals of the Chicago Area. <i>Science</i> , 13. |
| 1902 | Crook, A. R. | The Mineralogy of the Chicago Area. <i>Chicago Academy of Sciences, Bull.</i> 5. |
| 1902 | Alden, W. C. | U.S. Geol. Survey Geological Atlas, Chicago folio 81. Washington, D.C. |
| 1902 | Alden, W. C. | The Stony Industry in the Vicinity of Chicago. |
| 1905 | Kraus, E. H. | Occurrence and distribution of celestite bearing rocks. |
| 1906 | Weller, Stuart | Geological Map of Illinois by Stuart Weller, Ill. State Geol. Survey. |
| 1907 | Weller, Stuart | The Paleontology of the Niagaran Limestone in the Chicago Area. <i>Chicago Acad. Sci. Bull.</i> No. 4. |
| 1908 | Burchard, E. F. | Concrete materials produced in Chicago District. <i>Bull. 8. State Geological Survey, Urbana, Ill.</i> |
| 1908 | Atwood, W. W.,
Goldthwait, J. W. | Physical Geography of the Evanston-Waukegan region. Ill. State Geol. Survey. <i>Bull.</i> 7. |
| 1909 | Goldthwait, J. W. | Physical Features of Des Plaines Valley. |
| 1910 | Sewall, Harriet | Geographical factors in development of Chicago. <i>Univ. of Chicago.</i> |
| 1914 | Peatle, Roderick | Topography of the Bedrock under Chicago. <i>Journal of Western Society Eng.</i> |
| 1915 | Anderson, C. B. | Artesian water in Chicago. <i>Ill. Soc. Eng.</i> |

- 1917 Baber, Zonia Stony Island — A Plea for Its Conservation. University of Chicago.
- 1920 Baker, Fr. G. The Life of the Pleistocene of Glacial Period. University of Illinois.
- 1920 Chamberlain, R. D. The Geography of Chicago and its Environs.
- 1922 Good, Paul I. Chicago: A city of destiny. Geo. Soc. of Chicago.
- 1924 Downing, E. R. A Naturalist in the Great Lakes Region. University of Chicago Press. Chicago.
- 1925 Fisher, D. J. Geology of Joliet Quadrant. Illinois State Geological Survey. Bull. 51.
- 1925 Krey, F., Lamar, J. E. Limestone resources of Illinois. Bull. 46. State Geological Survey, Urbana, Illinois.
- 1925 Nichols, H. Early Geological History of Chicago. Field Museum.
- 1926 Savage, T. Silurian rocks of Illinois. Geol. Soc. Am. Bull. 37.
- 1926 Goode, J. P. The Geographic Background of Chicago.
- 1927 Fryxell, F. M. The Physiography of the Region of Chicago.
- 1928 Crossey, G. B. The Indiana Sand Dunes and Shore Lines of the Lake Michigan Basin.
- 1928 Holmes, T. I. Prehistoric lake and bedrock of Chicago. Chicago.
- 1930 State Geological Survey Map and Directory of Illinois Mineral Industries, Urbana, Illinois.
- 1930 West Soc. of Engineering The mineral wealth of Illinois. Journal of W.S. Eng.
- 1931 Ekblaw, G. Typical rocks and minerals in Illinois. Urbana.
- 1931 Pettijohn, F. J. Petrography of the Beach Sand of Southern Lake Michigan. Journal of Geology, Chicago.
- 1931 Fenton, C. L. Niagaran stromatopoid reefs of the Chicago region. A.M.N.
- 1932 Ekblaw, G. E. Some Problems of Engineering Geology in the Vicinity of Chicago. Trans. Acad. Sci. Ill.
- 1933 Schultz, J. R. Chert in the Niagara Formation in the Vicinity of Chicago. Trans. St. Acad. Sci. Illinois.
- 1934 Ball, John R. The fossils of the Chicago region. Chicago Acad. Sci.
- 1935 Hough, J. L. Bottom deposits of Southern Lake Michigan. Journal of Geology 1935, No. 2.
- 1936 Bretz, H. Chicago Areal Geological Maps. State Geological Survey, Urbana, Illinois.
- 1937 Grim, R. E., Lamar, J. E. The Clay Minerals in Illinois. Limestone and Dolomites. Journal of Geology, V. 45.
- 1937 Lamar, J. E., Grim, R. E. Heavy Minerals in Illinois Sands and Gravels of Various Ages. Journal of Sedimentary Petrology.
- 1937 Todd, J. P. Preliminary Study of Lake Michigan Sedimentation at Evanston. Trans. Ill. St. Acad. Sci. 30.
- 1939 Bretz, J. H. Geology of the Chicago Region. State Geol. Surv. Bull. 65.
- 1940 Grim, R. E., Bradley, F. Investigation of the Effect of Heat on the Clay Minerals. Jour. Amer. Cer. Soc., V. 23.
- 1942 Ball, John R. The great ice age in Illinois. Chicago Naturalist.
- 1942 Grim, R. E., Rowland, R. A. Differentiation Thermal Analysis of Clay Minerals. Amer. Min., V. 27.
- 1942 Willman, H. B. Feldspar in Illinois Sands. Rept. of Investigations. Urbana, Illinois. S.G.S.
- 1942 Nichols, H. Magnesium under Chicago. Field Museum News, Chicago.
- 1942 Chicago Plan Commission Industrial and Commercial Background for Planning Chicago.

- 1943 Horberg, L. Buried Bedrock Valleys East of Joliet and Their Relation to Water Supply. Ill. Circular 95. Ill. Geol. Surv.
- 1943 Horberg, L., Mason, A. C. Bedrock Surface and Thickness of Glacial Drift in Will County. Trans. Ill. Acad. Sci., V. 36, N. 2.
- 1943 Willman, H. B. High Purity Dolomite in Illinois. Reports of Investigations, 90. Ill. Geol. Surv.
- 1943 Willman, H. B. Resistance of the Chicago Area Dolomites to Freezing and Thawing. State Geol. Survey Bull. 68.
- 1944 Lowenstam, H. A. Niagaran Reefs in Illinois and Their Oil Accumulation. Reports of Investigations. State Geol. Surv., Urbana, Illinois.
- 1947 Kenneth, J. Rogers The Origin of Dolomite. Earth Science Digest.
- 1948 Lowenstam, H. A. Studies of the Niagara interref formation. N.E. Illinois.
- 1949 Lowenstam, H. A. Facies Analysis of Niagara Rocks. Trans. Ill. Acad. Sci., V. 42.
- 1949 Lowenstam, H. A. Niagaran Reefs in Illinois and their relation to oil accumulation. Urbana.
- 1949 Isfort, Louise G. Partial Bibliography of Natural History of Chicago Area. AMN., V. 42.
- 1950 Gutschick, K. A. Building Material Industries of Metropolitan Chicago. University of Chicago (manuscript).
- 1950 Otto, H. Interpretation of Glacial Drift in the Chicago Area. University of Chicago (manuscript).
- 1950 Chicago Association of Commerce and Industry A Survey of Resources of the Chicago Industrial Area.
- 1950 Alden, William C. Notes on Chicago's Areal Geology. Chicago Assn. of Commerce and Industry.
- 1951 Livesay, A. Story of Geology in Illinois (The past speaks to you). Springfield, Illinois.
- 1951 Bretz, H. The stages of Lake Chicago, their causes and correlation. Amer. Jour. Sci., V. 294.
- 1951 Johnson, Fred, Jr. Fabric of Limestones and Dolomites. University of Chicago (manuscript).
- 1952 Robbins, C., Keller, W. D. Clays and Other Noncarbonate Minerals in Some Limestones. Jour. of Sed. Petrology, V. 22, N. 31.
- 1952 Graf, Donald L. Preliminary report on Results in Differential Thermal Curves of Low Iron Dolomites. Amer. Miner. 1952.
- 1953 Krumbein, W. C. Lake Michigan beaches sand sampling. Am. G. Trans.
- 1953 Adams, Harry Chicago's Own Clay Stone Helped Build It. Chicago Daily Tribune, June 26.
- 1953 Horberg, Leland The surface bedrock of the Chicago area. Ill. Geol. Survey, Urbana.
- 1953 Bretz, J. H. Geology of the Chicago Region. Part II, The Pleistocene. State Geological Survey.
- 1954 Otto, H. G. Interpretation of the Chicago Area Bedrock Surface From Borings. Northwestern University (ref.)
- 1955 State Geological Survey Mineral Industries of Illinois (Map). Urbana, Illinois.
- 1956 Burnham, J. Planning the region of Chicago.

- 1959 Turley, T. J. On the minerals of the Chicago area. Rocks and Minerals, Sept.-Oct. 1959.
- 1959 Bader, R. S.,
Teacher, E. D. A list and bibliography of the fossil mammals of Illinois. Chicago Acad. of Science.
- 1960 Turley, T. J. Minerals of the Chicago Area. Alphabetical List. Earth Science, V. 13, N. 6.

Editor's Comment: In our December 1960 issue of *Earth Science*, we published an article, with list appended, on the "Minerals of the Chicago Area" by author Turley, making reference to a bibliographical list of publications covering the geology and the geography of this region, which we believe to be the most complete list ever assembled in one publication. Feeling that such a list would prove invaluable to the hundreds of Rockhounds living in the area, as well as many elsewhere throughout the country, we are now publishing the list as above, trusting that it will add much of value as reference material, and perhaps stimulate new interest in promoting the study of the geology of their home area by many of our readers.

Our genuine thanks is due Prof. Turley for this valuable contribution. B.H.W.

(Continued from page 81)

Considerable space has been allotted to prospecting methods and means of locating particular types of deposits. Methods of sampling, analyzing, and evaluating material are described in detail. The author has included photographs of equipment and diagrams of operations. Two chapters, new to this edition, are "Alluvial Diamond Mining" and "Mining of Beach Sands."

EXPLORING UNDER THE EARTH. Roy A. Gallant. Doubleday & Company, Garden City Book. 1960. 121 pp.

From the list of books previously compiled by Mr. Gallant's prolific pen, it appears that he has explored the universe, the weather, chemistry, and sundry other subjects.

"Under the Earth" means the interior of the "oblate spheroid" of 197 million square miles of surface area on which we live. We are told how the land mountains were formed, the shape of the original continents, and the physiography of the ocean bottoms. For good measure there is something on glaciers, origin of coal and petroleum, and seismology. We liked particularly the section on earthquakes and their waves.

The publishers do not suggest an age range for which this book might be suitable. Its lack of a bibliography and the incomplete references to but a few author-scientists suggest it is not for the advanced student. Phrases such as "educated guesswork" and "probing in the dark", however, place it beyond the age which has not yet learned to question. Its chief value probably lies in its capacity to stimulate further reading in earth science subjects.

The illustrations are imaginative, some in bold colors.

PRINCIPLES OF METEORITES. E. L. Krinov, Scientific Secretary of the U.S.S.R. Academy of Science. Pergamon Press Inc., 122 East 55th Street, New York 22, N.Y. English Version, 535 pp. 1960. \$12.00.

This work is perhaps the most complete compilation of meteoritic data, on a world wide basis, yet to be assembled in one volume. It contains a broad exposition of problems dealt with in meteoritics, covering the study of the material composition, structure, morphological and physical properties of meteorites—the only extra-terrestrial matter falling from interplanetary space onto the Earth—together with the study of the conditions under which meteoric bodies move through the Earth's atmosphere and in interplanetary space.

Translated from the Russian by Irene Vidziunas, Division of Geological Science of C.I.I., and edited by Harrison Brown of said Institute and Division. Profusely illustrated by off-set printing, it consists of eight chapters, each presenting a different branch of the subject. The book may be used as a supplementary text by students taking a special course in meteoritics or meteor astronomy, and is also recommended as a text for all natural science faculties at universities.

Completely indexed at the close, and followed by an appendix including a catalogue of world wide meteorites and other pertinent data, we consider the work to be a definite and constructive addition to the broader knowledge of the subject of meteoritics.

IF YOU LIVE IN
MIAMI
Subscribe to
EARTH SCIENCE
at
HARRY E. LEWIS

6421 S.W. 41st St., Miami, Fla.

ROCKS AND MINERALS

(A Magazine for Collectors)

If you collect rocks, minerals, sands, pebbles, crystals, ores, gems, **ROCKS and MINERALS** is your magazine. Founded 1925. Issued once every two months. 112 pages per issue. \$3.00 a year (sample copy 60c.)

ROCKS and MINERALS

Box 29 — Dept. ES Peekskill, N. Y.

WANT FUN AND PROFIT?

SEND FOR THIS CATALOG

Make personalized desk sets, use for a base a shell, a stone, an antique, or any interesting small object. Perfect for gifts. Good sales prospects using regional material... driftwood at seashore, etc. Catalog of accessories 25c refundable.



HEARTSTONE ENTERPRISES
AUBURN ROAD • SENECA FALLS, N. Y.

If YOU'LL be moving SOON, give us your new address NOW, as far in advance as possible. We change your address ONLY UPON DIRECT NOTIFICATION FROM YOU.

Present Address

Name _____

Street and No. _____

Town & Zone _____ State _____

Effective on _____ my address will be:

Name _____

Street and No. _____

Town & Zone _____ State _____

TEXAS FOSSILS—An Amateur Collector's Handbook. William H. Mathews III. Guidebook 2. Bureau of Economic Geology, University of Texas, Austin 12, Texas. 1960. 123 pp.

While designed, as the title indicates, for Fossils of the Texas area, the book will, however, prove to be an invaluable aid to amateur collectors of fossils and students of paleontology, wherever they may reside.

Profusely illustrated with more than 50 plates of very excellent drawings of fossils representative of the past geological ages, we can recommend it highly as a very useful guide for laymen. An introductory chapter, "What are Fossils," gives one a concise insight into the history of the subject, and such other topics as the "Preservation of Fossils," etc., are most expertly handled.

Page diagrams illustrating the Geological Range of Major Groups, and those showing I, Radial Symmetry; II, Bilateral Symmetry; and III, No Apparent Symmetry, are especially unique and helpful. A colored Generalized Map of Texas keying the exposed formations of the various Geological Ages is also present in the book, and the closing reference bibliography, glossary and index are most adequate.

FOSSIL COLLECTING. Richard Casanova. English Edition. Farber and Farber, London, 1960. 142pp Illustrated. 18s—net.

This illustrated guide is about a fascinating and increasingly popular hobby. Beginners will welcome this book, for it is written simply and kept as non-technical as possible, while for the advanced collector it contains useful detail and information. Although it is a practical guide to fossil collecting in the British Isles, frequent reference to other countries is made wherever this is illuminating and relevant.

A history of great collectors and their discoveries is outlined at the beginning, before Mr. Casanova goes on to explain what exactly a fossil is and how it is formed, carefully classifying the various types of fossils and giving detailed accounts of the main groups. In a section covering each of the great geological periods in chronological order, the author discusses the conditions and climates which were probably prevalent at these times, and describes the fossils characteristic of each era. Against this back-

ground the author acquaints his readers with the actual field of collecting fossils: their excavation, preparation, identification and display; and he tours the country introducing the would-be collector to the best fossil localities of each county.

The volume is elaborately and attractively illustrated with many photographs and drawings to aid better understanding of the text, and includes a bibliography.

(Continued from page 79)

a two-day visit to Chicago to visit the Museum of Natural History and the Museum of Science and Industry.

TRI-COUNTY ROCKS AND MINERALS SOCIETY held a lapidary clinic at its January meeting. The session was opened with a brief talk on "Cutting and Polishing," by Ed Beaumont, who then moderated a question and answer period on lapidary problems.

EARTH SCIENCE CLUB OF NORTHERN ILLINOIS at a recent meeting of its new lapidary section heard Mrs. Edith Schwendeman, noted lapidary, speak on "Contrary Minerals and Contrary Opinions." Mrs. Schwendeman recommended that beginners work with good material and not use inferior "practice" stones. It is better, she advised, to try to get one superior gem from a slab of gem stone rather than several mediocre gems. She prefers conventional designs for her gem settings, and reserves free form designs for thomsonite and other gems that lend themselves well to asymmetrical settings.

MICHIGAN GEM AND MINERAL SOCIETY sponsored a class in "Geology" last fall by Dr. Sandefur of Michigan State University. Both the class and the instructor were so popular with the club's members that the society has arranged for Dr. Sandefur to teach a 15 hour course in Mineralogy for the group this Spring.

MINNESOTA MINERAL CLUB will hold its annual gem show on April 6 at Southdale, 66th St. and Frances Ave., Bloomington, Minn. The show will be open to the public from 1:00 p.m. to 9:00 p.m.

MICHIGAN MINERALOGICAL SOCIETY on Feb. 13 heard Don Erhart of the Michigan Bell Telephone Co. speak on "The Artificial Growth of Crystals." His talk was supplemented with two Bell Telephone films, "Introduction to Crystals," and "Crystal Clear." Mr. Erhart gave particular attention to quartz, silicon and germanium crystals and their use in communication systems.

INDIA MATERIALS

Select Star Ruby
Green Moonstones, one, two and 3 grades
Moonstones, fine quality assorted colors
First Quality Sunstones
Various Size Garnet Cabs,
Large Garnets for faceting.
Aventurine, Zebra Agate, Carnelian
Agate.

FROM BRAZIL

Beautiful banded Agate Slabs, fracture free, 6 square inches and up, a collectors item.
Rough Agate 2 to 8 lb. chunks.
Amethyst for faceting 50 cents to \$1.50 per piece.
Rose Quartz

AUSTRALIA

Opals, various sizes and prices.

For the specimen collector, Selenite Hour Glass Crystals, Barite, Roses, Lepidolite Nodule.

We have a variety of other material in slabs and rough. Findings and Lapidary Supplies. Dealer for Covington, Frantom, Highland Park, Rocks and Ultra Violet Ray Products. Write for price list.

RUBEY'S ROCKS

9624-49th Avenue Oak Lawn, Illinois

TOM ROBERTS ROCK SHOP

1006 South Michigan Avenue
Chicago 5, Illinois
Wabash 2-7085

Change In Hours:
Monday through Saturday
10:00 A.M. to 5:30 P.M.

COMPARISON MINERAL SPECIMENS

70 different 1" specimens, \$7.00 postpaid.
Send for sample order of ten, \$1.50 postpaid.
(Beryl, Chromite, Bauxite, Cinnabar, Garnierite, Lepidolite, Smalite, Arsenopyrite, Asurite, Geothite. Each specimen correctly labelled.)
Send for free details on how to obtain up to 210 specimens for only \$18.50—any ten for \$1.50; any 50 for only \$6.00, postpaid.

MINERALS UNLIMITED

1724 University Avenue, Dept. E, Berkeley 3, Calif.
California customers add 4% S. tax.

PETOSKEY STONES

Choice Greys and Browns with lots of eyes.

Direct to you from World's only source.

90c/lb. plus postage;

5 lbs. \$4.50 PP in U.S.A.

Special rates on large amounts.

EDWARD HEISE

104 Mason St., Charlevoix, Mich.



YOU can buy with confidence
at the sign of the triangle. It
means HONESTY, INTEGRITY,
FAIRNESS and FRIENDSHIP.

AMERICAN GEM & MINERAL SUPPLIERS ASSN.
3657 West 58th Pl., Los Angeles 43, Calif.

FIRELANDS GEOLOGICAL CLUB is enjoying a new game called "Rocko" that was originated by Mrs. Grace Eichenlaub who is a member of the club. The game is much like bingo, except that the 25 squares on the cards are filled in with the names of rocks, minerals, fossils, gems, and Indian artifacts. The same names are printed on the tiny cards in the caller's box. When the caller shakes the box, pulls out a card and calls the name on it; anyone who has a player's card with the same name on it, covers it with a piece of limestone gravel. A player wins a game by calling "Rocko" when every name on his card is covered with limestone. Rocko can be varied by requiring that only four corners and the center be covered, or that just one line, up, down or diagonal be covered.

DOUBLE I GEM AND MINERAL SOCIETY recently enjoyed a talk and movie on "Asbestos", which was presented by Verne Montgomery, Central Regional Vice President of the Midwest Federation. Mr. Montgomery, who is always an enjoyable speaker, also presented everyone present with specimens of asbestos for their collections.

ILLOWA GEM AND MINERAL CLUB is sponsoring an adult education class on gem-cutting and jewelry-making. The society has had its share of being blamed for damages caused to local property by rockhunters and believes that in most cases the guilty were not members of the club. It has therefore requested that owners of the collecting areas, popular with the society, ask anyone who is caught damaging property to show his club card or other identification, and then notify the club of the damages. The club intends to cancel the membership of any member who is found guilty of violating its field trip code by not respecting public or private property.

EAST OHIO LAPIDARY CLUB, undaunted by distance, made a 575 mile field trip to Boulter, Ontario, Canada, last September. The club had good hunting at the Old Rubey Mine which was opened by J. H. Jewell in 1910. After several pounds of rubies were mined and \$50,000 was spent, Mr. Jewell put his rubies on the market, only to find that they were garnets, some gem grade. Another day was spent at Robillard Mountain where the visitors found a plentiful supply of corundum bronze crystals which cut into pretty "golden eyes". The group spent their third and last day in Canada at the York River Mining Company's Woodcox mine where they collected such cutting materials as amazonstone, sunstone, pink corduroy spar, and smoky quartz.

The trip was arranged by Jack Ellet of the York River Mining Co., who is a member of the East Ohio Lapidary Club. Guests from the Akron Mineral Society and the Parma Lapidary Club also made the trip. While in Canada, the party was accompanied by a fire warden at all times, since the trip was made during the high fire season. No one was permitted to smoke or carry matches.

PERU YMCA ROCKS AND MINERALS CLUB has received an announcement from the Indiana Geological Survey concerning its tenth annual field trip conference which will be held May 5-7, 1961, with headquarters at Marion, Indiana. The Survey writes: "The Silurian rocks of the Midwest have long been a fascinating aspect of geology, with several classic reefs and stratigraphic problems in Indiana as focal points of interest. Some of the proposed relationships of these rocks remain tentative, and the problems are still a challenge." With tongue-in-cheek, the club interprets this for its members as follows: "What all this means is that they don't know much about the seven pillars either, but are going to come to our favorite collecting grounds (petoskey stones), look at the scenery and try to figure it out." The club plans to attend some of the lecture sessions of the conference.

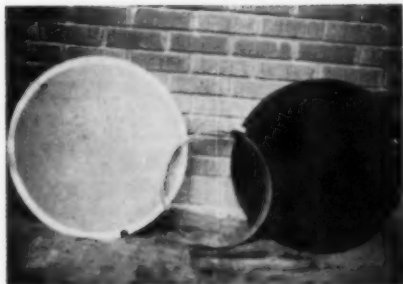
SILAM SPRINGS EARTH SCIENCE CLUB featured a slide program on "Geodes" at its January meeting. The society does not have far to travel to collect geodes and in its January bulletin a field trip through Brown and Pike Counties (Illinois) for geodes, colorful chert and marine fossils, is described.

On April 15-16 the society plans to hold its annual gem, mineral and fossil show, in combination with the Lincoln Orbit Earth Science Society, at the Sangamon County Fairgrounds in New Berlin, Illinois.

NOTICE

Grand Rapids Gem & Mineral Show. The Grand Rapids Mineral Society will present their Gem and Mineral Show at the Grand Rapids Public Museum April 16 thru 30th, 1961. Chairmen of the show are Gerald Morris and Willis Atwell. The show will run three Sundays and two weeks.

The Central Nebraska Rock & Mineral Society will hold its Seventh Annual Rock & Mineral Show. Place: National Guard Armory, 2015 W. 3rd St., Hastings, Nebr. Time: 9 A.M. to 9 P.M. on April 14, 15, 16, 1961. For Information Contact: Mrs. Pat Hill, Sec. Central Nebr. Rock & Mineral Soc., 1230 N. California Ave., Hastings, Nebr.



Tum-Lap Tumbler, Lap and Polisher

A machine that will polish your baroques; A LAP that will put a high polish on your flat specimens, and with much less work and trouble. NO PUSH and PULL polishing, no weights to add; just place specimens in machine, add ingredients, turn on machine and the results are the best.

A 24" lap machine that handles slabs up to 18" diameter. A machine that wears uniformly on bottom because the whole is being used, with a cast 13" or more in diameter.

Comes equipped for action with 1 kicker, 1 casting ring, 1 sanding mat, 1 polishing pad and a rubber band—less motor.

Complete instructions included with sale of machine only.

Price **\$169.00** F.O.B. Boise, Idaho

STEWART'S GEM SHOP

2620 Idaho St.
Boise, Idaho

CHRIS ROCK SHOP

2013 College Blvd.
Boise, Idaho

MARIPOSITE

From the MOTHER LODE country of California we are now shipping top quality MARIPOSITE from a new vein. Second grade material will be crushed for terrazzo therefore only select material will be shipped. This MARIPOSITE is beautiful green and white with flecks of pyrite and silver. Beautiful cabs, spheres, bases and columns may be cut and polished or turned on the new rock lathe. A complete table lamp is now on display turned from this material and it is beautiful.

Slabbing chunks \$1.50 per pound
3/16" slabs 50c per sq. in.

Minimum order \$5.00

Include postage for your zone

Generous specimen pieces postpaid, \$1.50

GILBERT'S LAPIDARY

1801 E. 14th St. San Leandro, California

ROCKHOUND VISITORS WELCOME

When in St. Louis phone HA. 7-4358
for appointment.

Postpaid specials for April and May

Tiger-Eye, Golden 1/4 lb. 50c
Jasper, India, "Fine" 1/4 lb. 35c
Copper Rhyolite, Pa. 1/4 lb. 40c

QUALITY GUARANTEED FREE LIST
Charles M. Ozment

THE VELLOR COMPANY

P.O. Box 44 (ES) Overland, ST. LOUIS 14, MO.

Fine Minerals for the Dana Collector

Specializing in crystallized minerals, Franklin, N.J. minerals, and micro-mount material.

JOHN S. ALBANESE

P.O. Box 221 Union, New Jersey

2 ALL NEW CATALOGS

CATALOG 58-59

OVER 170 PAGES . . . 46 pages of mountings & findings with new styles never before cataloged. 28 pages covering geodes, minerals, rough gem materials and baroque. 84 pages of machinery, tools, and supplies. 8 x 11 size, completely indexed and bound with a heavy durable cover \$1.00 in stamps or cash postpaid.

BOOKS	BOOKS
Midwest Gem Trails	\$2.00
Northwest Gem Trails	\$2.00
Colorado Gem Trails	\$2.95
Arizona Gem Fields	\$2.50
The Agate Book	\$2.00
Gem Hunters Guide	\$3.95
Field Guide to Rocks & Minerals	\$3.95

Treasure Map of the Great

CATALOG 1960

OVER 70 PAGES of the newest styles of mountings and findings in filigree, sterling silver, gold filled, gold and rhodium plate. 33 styles of new filigree mountings. Fully illustrated with hundreds of photos. One of the largest catalogs of its kind ever published. 8 x 11 completely indexed and bound with heavy durable cover. 50¢ in stamps or coin postpaid.

BOOKS	BOOKS
Lake Superior Agate Book	\$2.50
Gemstones of North America	\$15.00
Quartz Family Minerals	\$3.75
Gemcraft	\$7.50
Gem Tumbling	\$2.00
Arizona Gem Trails	\$2.00
Gem Materials Data Book	\$2.00
Mojave Desert	\$1.00

CATALOGS AND CIRCULARS

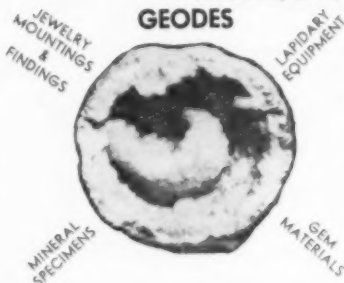
Enclosed please find Please rush my copies of the following:

- CATALOG #58-59. Approx. 175 pages of mountings, findings, equipment, supplies \$1.00
- CATALOG #1960 . . . 75 pages of all new mountings and findings 50¢
- Circular 1633 . . . 33 new styles of filigree mountings FREE
- Circular #2160 . . . DUR-A-LUX mountings and findings FREE

Refund certificate in each catalog or BOTH catalogs free with \$5.00 or more order from this ad.

GEODE INDUSTRIES

106 W. MAIN STREET NEW LONDON, IOWA
 Situated in S.E. Iowa. The biggest little town in Iowa. Gateway to the land of Geodes.
 Registered Trade Mark Applied for
COVINGTON LAPIDARY EQUIPMENT



Louisiana Materials & Specimens

Banded & Fortification agates, jaspers, Petrified Palm & woods.

COLLECTION Of Louisiana Materials. 9 different materials and specimens: Agate, jaspers, petrified coral, geode, oolite, petrified wood, fossil cast, palm, and extra item as "lagniappe". 2 lbs. mailed prepaid \$3.00. Ganoin Ivory, packet of 100 with instructions \$1.00.



KEN KYTE

530 East Boston St. or P.O. Box 161
 Covington, Louisiana

SHOT and FLAKE GOLD

From Alaska Placer Mines

12 Tiny Gold Nuggets \$4.00 Postpaid
 Weight of Dozen not less than 30 Grains Troy
 For your Collection, your Friends, or for
 Adding Distinction to your Jewelry
 Larger Quantities, 12 1/2¢ per Troy Grain

FRANK H. WASKEY

Oakville, Washington

GEMS & MINERALS

The complete magazine for the gem and mineral hobbyist

- HOW-TO-DO articles on gem cutting, gem collecting, jewelry making, minerals, mineral collecting, micromounts, fossils, and
- MAPPED FIELD TRIPS in every issue that are detailed with really complete information and directions, plus . . .
- JEWELRY PROJECTS with drawings and pictures that are easy, yet satisfying, to make, also . . .
- SHOW AND CLUB NEWS that keep you abreast of the activities of other rock hobbyists all over the country, and it's . . .
- PUBLISHED MONTHLY with 12 full issues each year, with hundreds of pictures, drawings and ads to help and guide you to more and more hobby enjoyment.

Over 26,000 gem and mineral hobbyists already use and enjoy GEMS & MINERALS. You can, too . . .

ONLY \$3.00 PER YEAR SAMPLE COPY—25¢

GEMS & MINERALS

P.O. Box 687H MENTONE, CALIFORNIA

ARE YOU LOOKING FOR A BIRTHDAY GIFT???

May we suggest that you seriously consider presenting an annual (or perhaps a 3-year) subscription to Earth Science to your friends and acquaintances as a 1961 birthday Gift.

In this way they will be reminded of your friendship six times each year, as Earth Science enters their homes. Do not forget your Public and School Libraries. Place Earth Science on their reading tables.

1 year \$2.50 3 years \$6.00

Name _____

Street and No. _____

City _____ Zone _____ State _____

Gift card to read: "From _____"

EARTH SCIENCE

BOX 1357, CHICAGO 90

BACK ISSUES OF

EARTH SCIENCE

We are overstocked on a number of back issues and need badly the space for our current files. Many of these surplus copies are of the very best published.

There are 30 different issues to select from, BUT

WE WILL MAKE OUR OWN SELECTION

Five Issues.....\$1.25 (Postpaid)
 Twelve Issues.....\$2.35

As long as they last—first come, first served.

EARTH SCIENCE

BOX 1357, CHICAGO 90

SUPPORT!!

**Earth Science
 Subscribe Today**

Notice to Advertisers

Our advertisers are respectfully advised that the advertising deadline for the next issue will be April 10th for all NEW ADS. Deadline for REPEAT ADS and for NEW PLATES submitted will be April 14th.

ADVERTISERS INDEX

Albanese, John S.	74, 89
Am. Gem & Mineral Suppliers	87
Black Light Eastern Corp.	50
Chris Rock Shop	89
Clement Minerals	80
Earth Science (Back Issues)	91
Earth Science (Subscriptions)	91
Gem & Mineral Fair, Saginaw	58
Gems and Minerals Magazine	90
Geode Industries	90
Gilbert Lapidary	89
Globe Minerals	80
Heartstone Enterprises	86
Heise, Edward	87
House of Enterprise	80
Jewelgems by Jay O'Day	80
Kyte, Ken	90
Lewis, Harry E.	52
Markert & Steele	80
McDonald, P. J.	74
Midwest Federation	58, 96
Mineral Equipment Company	95
Mineral Science Institute	91
Minerals Unlimited	87
Office Specialties	77
Riley Rock Shop	74
Roberts Rock Shop, Tom	87
Rocks & Minerals Magazine	86
Rubey's Rocks	87
Stewart's Gem Shop (Boise)	89
Vellor Company	89
Victor Agate Shop	77
Ward's Natural Science Estab.	74
Waskey, Frank H.	90
Willems, J. Daniel	74
York River Mining Co.	77

MINERALOGY

Offers unlimited opportunity for rock collector or Uranium prospector. Make it your career or hobby. We train you at home. Diploma course. Send for Free Catalog.

MINERAL SCIENCE INSTITUTE

Desk 11 • 159 E. Ontario • Chicago 11

CLASSIFIED ADVERTISING

Rate: Eight Cents per word, per issue. Minimum \$2.00, payable in advance. No proofs or copies for checking are furnished. Introductory words will appear in CAPITALS. When additional capitalization is required, each such word counts as two words. No charge for name and address.

Gemstones, Lapidary

IMPORTED GEM MATERIALS. Buy from your resident, reputable, and well established dealer: Selected tumbling cabochon, and choice faceting materials in the rough. Our specialty is still Australian Fire Opals. Also everything in cut stones such as Jade, Sapphires, Rubies, Emeralds; also Synthetics, etc. Price list available, wholesale and retail. FRANCIS HOOVER, 11526 Burbank Blvd., North Hollywood, Calif.

WYOMING JADE, generous slab, \$1.00. Choice: black, olive green, and phantom. Variety of tumbling material, 5 lbs., \$1.00. Good cutting material: Oolite, wood, agate, jasper, algae, turritella, 25¢/lb. Medicine Bow agate, stalagmite formation with dendrites, also fluorescent, \$1.00 per lb. Fossil fish, \$1.50 to \$5.00. Add postage. WITKA'S Hiway 30, West-end, Rock Springs, Wyoming.

PREFORMS. Choice, assorted, ring-size agates, 10 for \$1.25; Brazilian 40 x 30 mm., 10 for \$4.50; Brazilian 30 x 22 mm., 10 for \$3.50. Brazilian slabs 10 sq. in. for \$2.00. All 4 items postpaid \$11.00. Assorted agate ring stones, 10 for \$5.50, including 1 fiery special black opal. HUNTER & SONS, 4489 McKenzie Hwy, Springfield, Ore.

QUARTZ CRYSTAL BAROQUES, heat treated, colored blue, green, rose, golden, and clear. About 100 to a pound, assorted, \$4.50 per pound. Assorted Baroques: agates, tigereye, woods, about 200 per pound, \$4.50 per pound. Cullet Baroques, assorted colors, about 150 per pound, \$3.75 per pound. Slabs: South American agate, novaculite, jaspers, woods, etc., 20 sq. in., \$3.50. All above postpaid. CHAS. E. EAGLE, 410 South 5th Street, Watseka, Illinois.

WHOLESALE GEM MATERIAL. Save freight. Your choice—10 kinds. Palmwood, Opalite, Jasp-agate, Budseye, Golden Onyx, Crawfordite, Jasper, Chapenite, Verde antique, Travertine (green). \$16.50 per 100 lb. bag. Freight paid. Sample \$5.00 postpaid. MORTON MINERALS & MINING, 21423 Hwy 66, RFD 1, Barstow, California, Dept. E.

DEALERS: Write for wholesale price lists on our fabulous line of nontarnish-aluminum chains and findings. If you include \$1.00, samples will also be sent. Please include your tax number with letter. R. B. BERRY & CO., 5040 Corby St., Omaha 4, Nebr.

DIAMONDS: Thousands of fine crystals available. All sizes from small perfect crystals for micro-mounts to large perfect crystals for specimens and cutting. From 75¢ each to \$20.00 per ct. LAPIDABRADE, INC. 2407 Darby Road, Havertown, Pa.

"TONNYX DIAMOND" gold-color, crystal rosette pendant with sparkling, non-tarnishing gold-color chain \$2.00. Earrings \$2.00. Tie Clip \$1.50. Bolowith leather cord \$2.50. TONNYX, 2280 Girasol, Palm Springs, Calif.

IMITATION 18 x 13mm CABOCHONS. Goldstone-Fire Opal-Lapis Lazuli-Hematite-Chrysoprase, dozen 60¢. Acrylic Agacites: Amethyst-Emerald-Sapphire-Topaz-Cornelian-Garnet-Rose, dozen 40¢. Post-paid. R. MYLES HERBER, Box 176, New York 8, N.Y.

INDIA IMPORTER: Offers natural plum star sapphire cabochons for rings at \$2.00 per carat. Also specializes in select robin's egg blue Persian turquoise at 80¢ per carat. Your check returned if you aren't delighted. E. D. SKINNER, Box 4252, Station K, Milwaukee 10, Wis.

TURQUOISE NUGGETS! "Stone of the Blue Sky" from ancient mines on El Camino Real mission trail. Three nuggets in matrix, plus exact location details, plus gemstone-mineral catalogue \$1.25. WILDERNESS ORIGINALS, Canyon, Calif.

50¢ BRINGS YOU our beautiful catalog, 3 Sapphires and piece of Uranium. \$1.00 for the above, plus "3 Arizona Rubies" and piece of sparkling Galena. WHITE MOUNTAIN MINERALS, Campton, New Hampshire.

GOLD NUGGETS from Shasta Cascade Wonderland. In glass vials, beautifully magnified. \$2.00 per vial. Goldbearing black sand placer concentrates. Contain many of the heavier minerals. 7 grams, \$2.00. Order 1 of each for \$3.00. LESTER LEA, Box 942-E, Mt. Shasta, Calif.

COLLECTORS' RARE JADE SAMPLER: 10 JADES! Green, mosaic, and crystalline white jadeites; spring moss, mountain mist, blue, ivory, and jade-of-the-surf nephrites; botryoidal nephrite; and black chloromelanite. All, plus location details, and gemstone-mineral catalogue. \$2.00. **WILDERNESS ORIGINALS**, Canyon, Calif.

Minerals, Petrified Wood

WHOLESALE GEM MATERIAL. Save freight. Your choice—10 kinds. Palmwood, Opalite, Jasp-agate, Budseye, Golden Onyx, Crawfordite, Jasper, Chapenite, Verde antique, Travertine (green). \$16.50 per 100 lb. bag. Freight paid. Sample \$5.00 postpaid. **MORTON MINERALS & MINING**, 21423 Hwy 66, RFD 1, Barstow, California. Dept. E.

MEXICAN MINERALS: Write me what you want and price you offer. Will send if available and price fair. Bulk or specimen silver, rare or common, our specialty. Trial order 20 lbs. of 20 different minerals \$25.00, including 6 lbs. different agates; 5 lbs. different opals, rhodonite, and rhodocrosite; 4 lbs. brown, lavender, yellow, and reddish jaspers; balance mixed specimens new to U.S. collectors. Freight collect from Laredo, Texas. Send certified check with order. **FIDEL FERNANDEZ**, Danubio 138-14, Mexico 5, D.F.

MINNESOTA ALGAE, Jasper or Petoskey Stone, \$1.00/lb. Over 10 lbs., postpaid. Tumbled Wyoming mixture; Agate, Jasper, Wood, \$4.00/lb., postpaid. Variety of rough, slabs, tumbled, grits, some findings. Lapidary Equipment: "Rock," "Frantom." Open after 4:00 P.M. **HAZETT STAMP SHOP**, 620 North Grant, Bay City, Michigan.

BARITE ROSES. Choice \$1.00. Amazing Sand-Calcite crystals 25c up. Minimum order 50c plus postage. Choice Thumbnail to cabinet sized clusters from \$1.00. Orders over \$1.00 postpaid. Complete line of Rockhound & Lapidary supplies including rough and slabs. Dealers' inquiries invited. **SOUTH BEND ROCK SHOP**, 915 S. 32nd St., South Bend, Indiana.

GOLD-BEARING BLACK SAND from California. Complete composition and source given. \$1.00 per vial. **LOYD CASTEEL**, 842 Birch Ave., ES, Sunnyvale, Calif.

AGATE, jasper, petrified wood, mineral specimens. Retail-mail order only. Send stamps for list. **GENE ELMENDORF**, Marfa, Texas.

SPRING SPECIAL: Assortment of 20 inches plus of excellent slabbed material, Mexico and Texas agate, etc. \$3.00 ppd. Ring eye slabs, \$1.10. Free bonus. **STAN'S ROCK SHOP**, R. 2, on Centerville Rd., Carmi, Ill.

CRYSTALS, MINERALS, semi-precious stones; rough. Pocket size whetstones. Colorful Novaculite for cutting. Also, Rock jewelry. All Rock Hounds welcome. **HOUSE OF CRYSTALS ROCK SHOP**, R. #1, Box 624, Hot Springs, Ark. (12 mi. S. on Hwy. 7).

MEXICAN AGATE: Slabbing Package Special #220. 2 lbs. Casa Grande size 1½" to 2", 2 lbs. Persalles 1½" to 2", 2 lbs. Moctezuma 1½" to 2", 4 lbs. Sagenite type Lace good size, 2 lbs. Coyamite ¾ to 1¼". Postpaid anywhere \$17.00. **B. & H. ROCK SHOP**, Granbury, Texas.

MEXICAN MINERALS: Wholesale only. Boxed ready for retail trade. Showy specimens that move fast in your shop at 50c to \$1.00. Dark Amethyst, Azurite, Malachite, Smithsonite and many other colorful minerals. Wholesale list only. **B. & H. ROCKSHOP**, Granbury, Texas.

MEXICAN AGATE: Tumbling Package Special #110. 2 lbs. Amethyst broken crystals, 2 lbs. Psilomelane, 2 lbs. Rexite, 2 lbs. purple broken Agates, 4 lbs. colorful Lace, 2 lbs. Red Moss. Postpaid \$12.00. **B. & H. ROCK SHOP**, Granbury, Texas.

SOUTH TEXAS AGATE from the Rio Grande. Variegated colors and patterns. Carefully selected for slabbing and cabochons. 7½ lbs., \$5.00 postpaid; 100 lbs., \$35.00 FOB. **THE AGATE SHOP**, 704 W. Kimball, Raymondville, Texas.

WHOLESALE GEM MATERIAL. Save freight. Your choice—10 kinds. Palmwood, Opalite, Jasp-agate, Budseye, Golden Onyx, Crawfordite, Jasper, Chapenite, Verde antique, Travertine (green). \$16.50 per 100 lb. bag. Freight paid. Sample \$5.00 postpaid. **MORTON MINERALS & MINING**, 21423 Hwy 66, RFD 1, Barstow, California. Dept. E.

Fossils

FOSSILS: 15 classified \$2, 15 Pennsylvanian \$2.50; 15 Permian \$2.50; 15 Ordovician \$2.50; 15 Devonian \$2.50; 50 classified \$7.50. Mammal teeth, bones, plants; everything in fossils. Send postage. List. **PIONEER MUSEUM**, Burnet, Texas.

PENNSYLVANIAN AGE FOSSILS.

Excellent preservation. Author, group, formation, and location index classification. 100 plus in 15 to 20 kinds packed in cellophane bags and postpaid, \$5.00. Penn. imprints of plants, in massive hematite, 25¢ each; 3 different ones in the above 100. GUY QUINN, Box 190, Eastland, Texas.

TRILOBITES (Phacops), \$1.00 and up.

Fossil collection, 9 different specimens mounted on attractive card, each identified, \$1.25. Ten different Brachiopods, \$1.50. Gastropod and Pelecypod, 35¢ each. Three different corals, 75¢/set. DON H. WHITE, Box 181, Ottawa Lake, Michigan.

FOSSIL MARINE LIFE. Millions of years old. Mounted on decorative mahogany base. Interesting, educational, \$1.00. HOUSE OF ENTERPRISE, P. O. Box 88, Garden City, N. Y.

MUSEUMS and UNIVERSITIES purchase my Fossils. Why don't you? Free listing with plates available. Extensive variety; Pliocene, Miocene, and Eocene. Also, Pennsylvanian, Devonian, and Ordovician. Fern fossils; fish fossils; vertebrate and invertebrate fossils. 75,000 (!) shark teeth in sizes up to 6 inches. 250 varieties of intact shell fossils. To become acquainted: 25 identified, all different, \$3.00; 30 shark teeth, \$3.00. Both offers, \$5.00. Add 50¢ to share postage. MALICKS, 5514 Plymouth Road, Baltimore 14, Maryland.

ORDOVICIAN FOSSILS! Trilobites, Crinoids, Cephalopods, Brachiopods, Gastropods, Bryozoa. You name it, we have it. Send for your free price list. DENS' FOSSILS, 2326 Barton Blvd., Rockford, Illinois.

Equipment

MICROSCOPES: Large Stock. All makes. New, and Used Completely Rebuilt. Send 10¢, Stamps or Coin, for listing. Refractive and heavy liquids, Specific Gravity Balances, Scientific Equipment. LAPIDABRADE, INC. 2407 Darby Road, Havertown, Pa.

SPECTROSCOPE (results like a \$30.00 instrument) and illustrated, cloth instruction book 220 pages for quick ore and mineral analysis. Both \$7.00. SCIENCO, 875 Arastradero Rd., Palo Alto, Calif.

ULTRAVIOLET LAMPS, richly housed in aluminum or bakelite; assembled or kits from \$10.50. America's most complete line of lamps, kits, filters, tubes, accessories. Free literature. RADIANT ULTRA VIOLET PRODUCTS, Cambria Heights 11, N.Y.

SALT LAKE CITY, UTAH. Drop in when out this way. We have specialized in Equipment, Findings, Supplies, etc. for Rockhounds since 1950. You may pick up your Free copy of Utah locations, or send a stamped envelope. However, would rather be blessed with a visit. No catalog. KEN STEWART'S GEM SHOP, 136 West Temple, (1/2 block west of Temple Square).

Exchange and Miscellaneous

TRY CARVING for fun and profit. Beautiful Colorado Alabaster can be carved with wood tools. We also have Snowy Range Marble in Pink, Red Salmon, and Mottled Gray. \$1.00 per lb. We pay postage. DEL-GLO COMPANY, P. O. Box 930, Cheyenne, Wyo.

LARGEST COLLECTION. Slides of minerals and Geology Club programs with scripts. Send 4¢ stamp for rental list. Catalog of mineral or geology slides (state which), sample and 25¢ credit slip. Postpaid for 65¢. Come and use our equipment in our "Do-it-yourself" lapidary shop. Pay by the hour. ROCK HOUND SPECIAL, 8441E Bolsa Ave., Midway City, Calif.

GET YOUR COPY of "The Truth about Adams Diggings." Most famous lost mine in the Southwest. Single copies \$1.00 cash with order, 60¢ each to club members for orders of 10 or more through Club Secretary. GLEN A. BURCH, 10304 Propps Drive, N.E., Albuquerque, New Mexico.

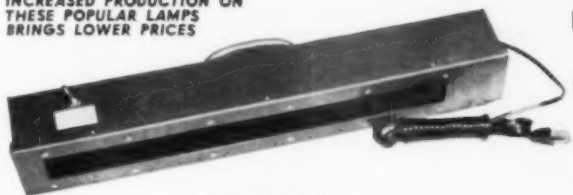
BEGINNERS' ILLUSTRATED CATALOG. Specialized mineral, gem, crystal, fluorescents, rock, and fossil study collections. Kits—ultraviolet, chemical, blowpipe, others. Manuals, field guides, equipment. Various beginner accessories, 25¢. MINERAL LORE, 3004 Park Avenue, San Bernardino 9, California.

CLAY CENTER, OHIO SOUVENIR BOOKLET. Of interest to the hundreds of rockhounds who visit this northwestern Ohio town each year. Twelve pages with 16 photographs of minerals, fossils, quarry, laboratory, leading citizens, etc. 50¢ postpaid. JIM NOVOTNY, Clay Center, Ohio.

MUSEUM DIRECTORY, "Mineral, Fossil, Rock Exhibits and where to see them." Lists information on nearly 200 public museums in U.S. and Canada with geological exhibits. Order from AMERICAN GEOLOGICAL INSTITUTE, 2101 Constitution Ave., Washington 25, D.C. \$0.50.

NEW LOW PRICES! SPECTACULAR FLUORESCENCE

**INCREASED PRODUCTION ON
THESE POPULAR LAMPS
BRINGS LOWER PRICES**



RAYTECH SUPER

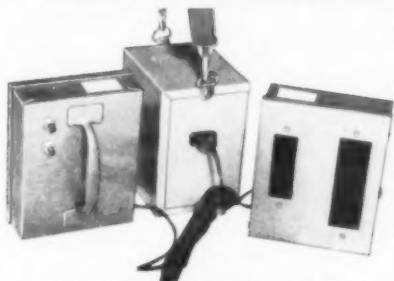
Shortwave **59.50**
(was 64.50)

Longwave **29.50**
(was 34.50)

COMPARE!

- **POWER** — 10 times as much Ultraviolet as most lamps sold
- **COVERAGE** — Alzak reflector and 16 inch filter give wide brilliance
- **ECONOMY** — More Ultraviolet per dollar. Compare with any other lamp
- **LIGHTWEIGHT** — Only 5½ lbs. and balanced
- **CONVENIENCE** — Large handle—easily removed for mounting

LEADING NEW LONGWAVE SHORTWAVE LAMP



RAYTECH DUAL \$29.50

BC-5 Battery adapter with shoulder strap, as shown.....\$5.75
Batteries 45-Volt No. 202 per set of two.....\$7.20

- **POWERFUL** — Unexcelled in its class
- **CONVENIENT** — Well placed comfortable handle and starters permit one hand operation
- **LARGE FILTERS** — Over 8.4 sq. in. filter opening. Largest in its field
- **SOLID CONSTRUCTION** — All metal. No light leaks. No rattle. No hum
- **COMPACT** — Only 5" x 6½" x 1⅞"
- **ATTRACTIVE** — Handsome, durable 2 coat baked gray hammer-tone finish

Other Lamps Available — Ask Your Dealer — Send For Catalog E

SATISFACTION GUARANTEED

ORDERS: Please include 75c with each order for postpaid delivery in USA

MINERAL EQUIPMENT COMPANY

HAMPDEN ROAD, SOMERS, CONN.

MIDWEST FEDERATION
21st ANNUAL
CONVENTION

Make Your Plans Now to Attend
SAGINAW COUNTY FAIRGROUNDS
SAGINAW, MICHIGAN
JUNE 29, 30, JULY 1, 2, 1961

Host Society to the Midwest

is the

TRI-COUNTY ROCKS and MINERALS SOCIETY

Saginaw, Bay City, and Midland, Michigan

EVERY MIDWEST CLUB SHOULD BE
REPRESENTED

Start Planning Now for

INDIVIDUAL EXHIBITS

JUNIOR EXHIBITS

COMMERCIAL EXHIBITS

SOCIETY EXHIBITS

SPECIAL DISPLAYS

See Page 58 For Further Information

